SEPTEMBER 1947

ROCK PRODUCTS

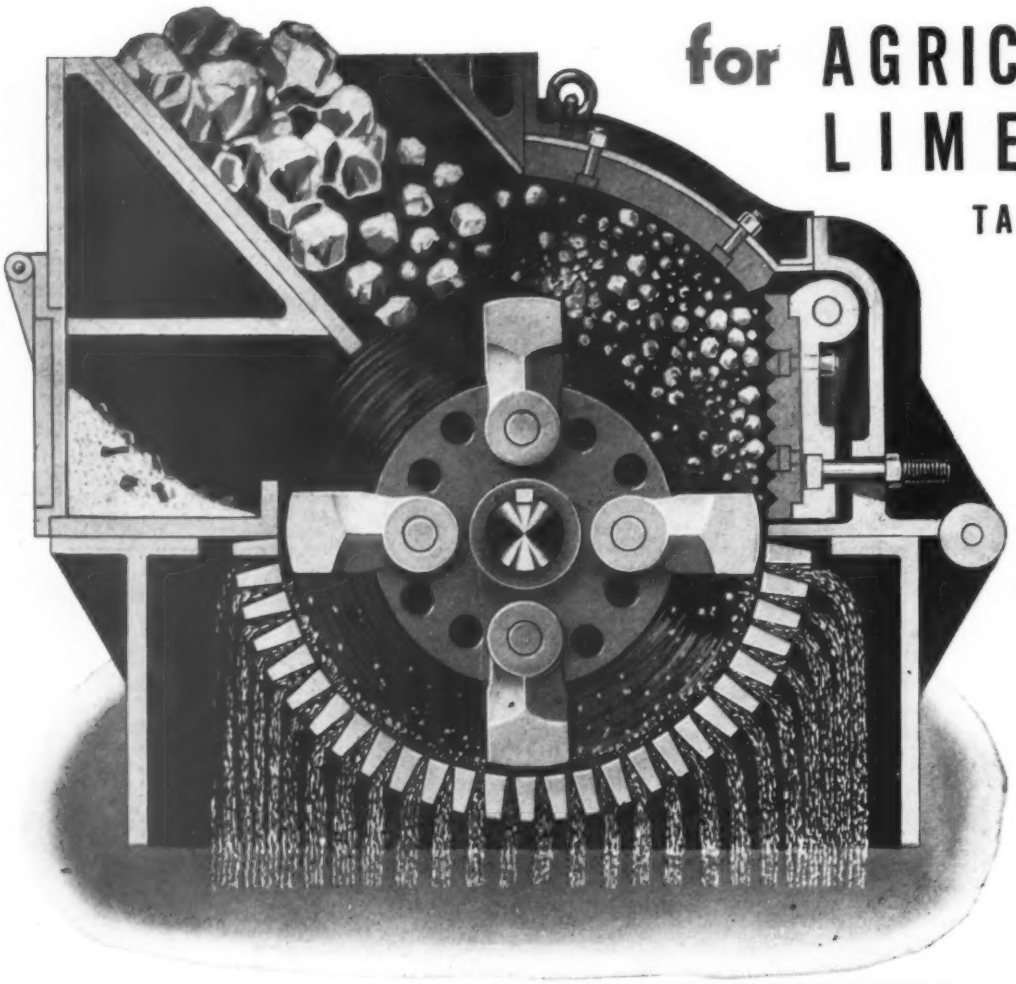
Michigan College of Mining and Technology
Houghton, Michigan

THE INDUSTRY'S RECOGNIZED AUTHORITY

Aggregates plant of Griffith Co., Bakersfield, Calif., has washing

THE WILLIAMS "NF"

for AGRICULTURAL LIMESTONE



TAKES 4-INCH FEED OR SMALLER

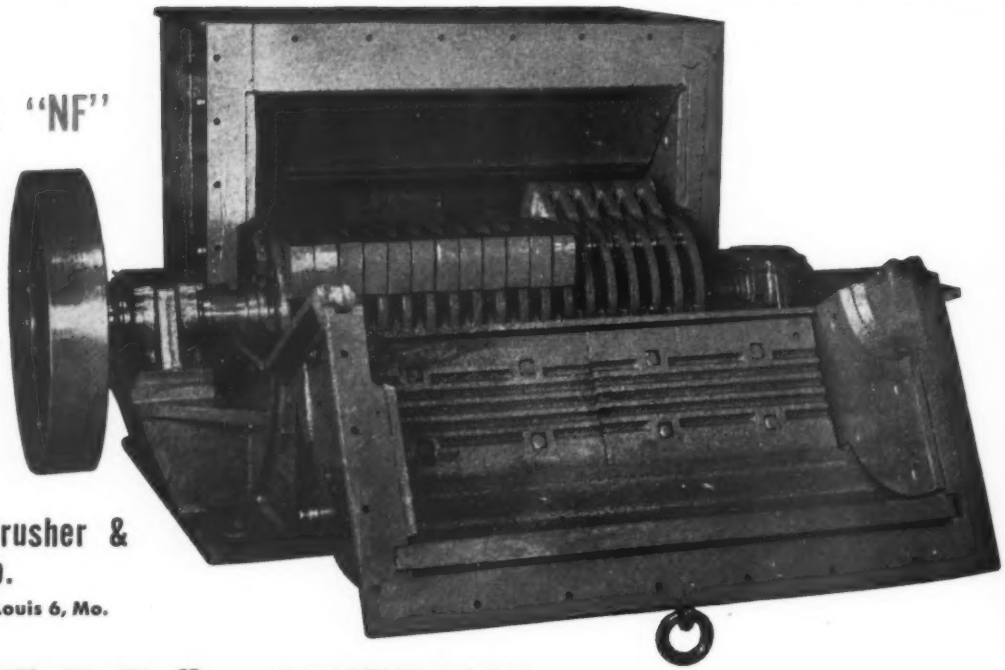
The Williams "NF" Hammer Crusher is the outstanding machine in its field for reducing 4" rock to ¾", ½" or agricultural limestone. The fact that Williams has pioneered the hammer mill and has been foremost in its developments speaks for itself. No attempt has been made to build the "NF" cheap in first cost, instead special care has been given to dependability and final cost.

The "NF" is built in a large range of sizes with capacities from 3 to 75 tons per hour, affording a size mill for any job.

Sectional view of Williams "NF" type hammer mill, with heavy liners and grinding plate for limestone and other hard material. Particular attention is directed to the grinding plate adjustment which assures uniform close contact of hammers and grinding plate at all times. Also note the metal trap which provides an outlet for the escape of tramp iron.

FEATURES OF THE "NF"

- Adjustable Grinding Plate
- Hammers Adjustable to Overcome Wear
- Larger Capacities
- Lifetime Construction
- 2" Top Liners, 1" Side Liners
- Easy to Work On—Hinged Cover



The Williams Patent Crusher & Pulverizer Co.

800 St. Louis Ave.—St. Louis 6, Mo.

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

Williams

PATENT CRUSHERS GRINDERS SHREDDERS

Open view of the Williams "NF" mill showing heavy duty hammers, grinding plates, side liners and cover liners. Also shows easy accessibility to mill for repairs, etc.

"WE HEAR..."

September 1, 1947

A five million dollar program to produce elemental phosphorus, phosphoric acid and concentrated superphosphate is contemplated at an electric furnace plant planned for Idaho. Pilot plant tests of the process are being conducted at TVA, Wilson Dam.

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Prefabricated homes, which were supposed to revolutionize postwar building, have not made much of a dent so far and it seems doubtful that more than 50,000 units will be built this year. One of the reasons for slow progress is that the cost-saving advantages of volume purchasing and factory production have not resulted in any appreciable price reduction as compared to conventional building. Diverse building codes and labor acceptance in different cities have prohibited perfection of a completely packaged product with the result that 60 per cent of the total cost of a home is added on by subcontractors' charges at the site.

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Profits of U. S. industry in the June quarter were 84 per cent over the level a year ago and profits for the first half year were the highest in history. However, the point above which companies can earn profits is climbing ever higher.

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New construction put in place in July scored more than a seasonal gain of nearly nine per cent above June figures, according to the Department of Commerce, with a value of $1,139,000,000. Total public construction in July rose eleven per cent and private residential construction advanced nine per cent. On the debit side, privately financed non-residential building increased less than normally with only a one per cent gain.

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President Truman has signed a bill allowing completion of 100 slum clearance and low-cost housing projects in 75 cities. Previously, federal funds could not be used on housing projects where the construction cost exceeded $5000 per family or $1250 per room. Cities now may authorize completion of projects by paying the difference in construction costs over the former limit.

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Requirements of the Selective Service Act probably can be satisfied if an employer offers a returned veteran a "like" job in another plant of the company in a nearby location.

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Flood control and river work of the U. S. Army Engineers secured the bulk of money for construction appropriated by Congress before adjournment. New construction money totalling $1,189,000,000 for federal agencies now has been made available during the fiscal year that began July 1. Of the total, over $246,000,000 has been appropriated for general flood control work, in excess of $97,000,000 for harbor work and $194,600,000 is available for the Bureau of Reclamation.

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Gasoline prices evidently are on the increase. Bills to increase State gasoline taxes have been introduced in the legislatures of 22 States and the District of Columbia. The proposed increases range from 1/2 cent to 10 cents in Washington and they are not all for road building purposes. The State of South Carolina is ear-marking a proposed 1 cent increase for state schools.

WE HEAR

Latest estimate of the Commerce Department has it that new construction during 1947 will total $12.2 billion but physical volume actually will be less than two-thirds of the 1927 building peak. Construction costs currently are levelling off at about 90 per cent above 1939 figures.

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Freight car output in July was down instead of up as hoped. Steel shortages could not be blamed this time for failure to increase car supply but, instead, it was a combination of floods, holidays and vacations.

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In calculating overtime pay of workers under the Fair Labor Standards Act, a company likely can disregard bonuses paid as additional compensation for services already rendered, according to a federal district court ruling.

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A special message was sent Congress several weeks back by President Truman, asking an immediate start on a 10-year plan to control floods in the Mississippi Basin. The President requested an appropriation of $250,000,000 immediately for a flood control and reclamation project that ultimately would cost $6,000,000,000.

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An employer must consider payments made under a profit-sharing plan and commissions paid to employes for over-the-counter sales, in computation of overtime under the Fair Labor Standards Act. A federal court has ruled that such payments must be considered as part of the regular rate of pay.

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A new deadline for filing patent applications, February 29, 1948, has been set for cases where patent applications were not filed due to war conditions. Purpose of the date extension is to preserve the rights of U. S. inventors who could not file applications for patents in foreign countries within prescribed time limits.

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Toll roads evidently are the coming thing. Colorado has authorized toll road construction, and is planning a four mile highway between Denver and Boulder. Under the new law, Colorado toll roads would revert to the State as free public highways when toll collections have paid for the highway construction.

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New construction in July totaled $1,139,000,000, which represents a gain of 16 per cent over the like 1946 period and 8 per cent over June, 1947, figures. According to the Department of Commerce, total value of new construction put in place in the first seven months of 1947 is estimated at $6,487,000,000, 35 per cent over 1946 performance.

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Concrete block prices have been increased from one to three cents in the Pittsburgh, Penn., area. A 10-in. block sells for 25 cents and 12-in. units cost 29 cents. These increases plus advances of $1.50 per thousand for face brick will reflect in a raise of some $20 in cost of an average home.

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While total industrial output is going along at a level 86 per cent over the 1935-1939 prewar average, industrial chemicals continue to be manufactured at four times the prewar rate. New chemical plants continue to be built and the industry is expected to double again by 1950.

THE EDITORS

★ ★ Editor's Page

John L. Lewis' New Wage Agreement

WHETHER or not the soft coal mine operators let industry, the public and the nation down when the industry signed its new contract with John L. Lewis, wage increases that far surpass what industry spokesmen admit in defense of the agreement have been granted. Published statements to justify the operators' position are not convincing enough to satisfy those who believe that the deal came too easy and was more generous than necessary to avert a nationwide strike.

A spokesman for the soft coal industry, in defense of the contract, has claimed that the wage increase, which he calculates as 15 cents per hour, is not inflationary and does not set a new industrial wage pattern. This reasoning is based on the argument that coal miners were bypassed when workers in other industries were granted similar wage increases some months back. That of course is no argument for the case in point any more than the statement he made that because coal mining is different than most other industrial occupations a welfare fund of the kind provided for in the new contract is not pertinent or need not be set up in labor contracts for other industries.

Establishing a Precedent

Nothing needs to be followed, of course, but unions have a habit of basing their demands on precedent. Payment into welfare funds by employers, upped from 5 cents to 10 cents per ton of coal in the new agreement, is a wedge for additional provisions than wage increases that will be proposed in future labor agreements throughout industry. The Westinghouse and General Motors agreements, providing payment for holidays not worked, have set the stage for pressure to secure contracts having such concessions (not granted in coal) in other industries and we may anticipate clamoring for hospitilization, pensions, sick leave with pay, etc., as key industries give in to pressure. They may be worthy concessions but they nevertheless add enormously to the cost.

It is true that the increase granted miners was only $1.20 per day, 15 cents per hour, if we disregard that the miner now gets $13.05 for eight hours work as compared to $11.85 for the previous nine-hour day but anyway you look at it, he now earns well over 40 cents per hour more than he did. That's what counts in the cost of getting out coal.

Almost before the ink had dried on the contract, the price of steel jumped $5 a ton and increases in pricing ranging from 50 cents to $1.65 per ton were instituted for coal. Price adjustments considerably upward could well follow for a host of commodities basically made from steel.

Price increases for coal and steel are unquestionably serious at a time when prices should be held in line to aid against runaway inflation but there are more serious aspects to the coal agreement. The most dangerous implication is the ease with which an industry, itself a relatively small user of coal, can establish a pattern which works serious hardship on other industries where coal is a very significant item in costs. The railroads were not consulted, nor was the portland cement industry. Coal happens to be the largest single item in the cost of a barrel of cement and the cement industry had thus far been able justifiably to pride itself in its ability to hold prices down.

Psychological Effects

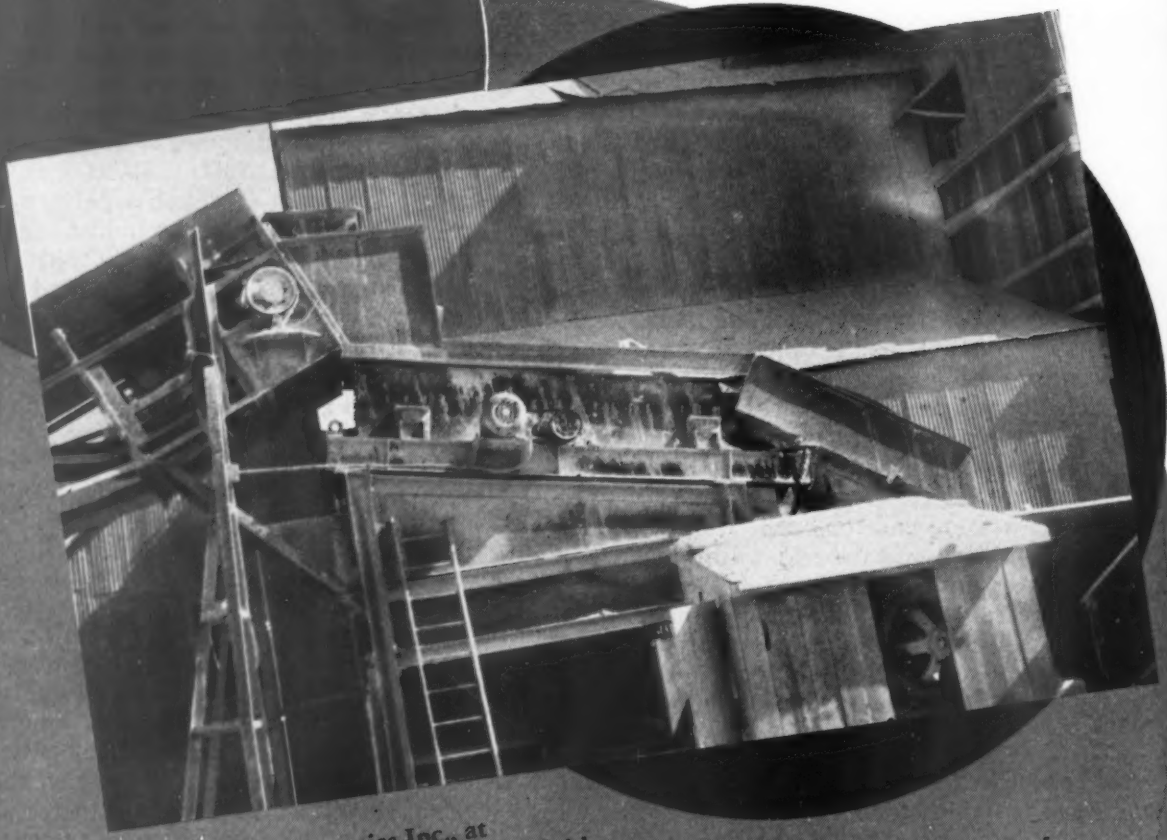
Of extreme importance is the psychological effect of the miners' wage increase on workers in other lines who have seen John L. Lewis' members promoted near the head of the working-man's wage class. That's what is worrying economists who follow national price trends as indicators of the extent of inflationary pressures. If the construction trades, for example, should be similarly boosted, construction activity would suffer a further serious setback and many would-be home builders would be unable to pay the increased costs. The public, as always, must pay these costs, and is made up of people whose average earnings are far below the trades scale now.

Those, who accuse signers of the coal miners contract with selling industry and the public down the river, believe that a deal that must have pleased John L. Lewis immensely, came far too easy. They feel that agreements as basic nationally as coal should come the hard way and be a product of intensive collective bargaining with full consideration of all implications in their effects on industry generally.

Economists have been preaching resistance by all to price increases, which reminds us of how the local grocer let us down the other day. Sweet corn was quoted at three cobs for a quarter. The supplier of the store happened in and overheard the transaction whereupon he openly told the grocer he must charge us a dollar a dozen "to make out." So, the price was changed accordingly and on the spot so that the third party could later get the figure he decided he wanted. The grocer did not resist, figuring to pass the increase along. It didn't work in this case.

Bror Nordberg

SIMPLICITY SCREEN SET-UP YIELDS 500 TONS RIPRAP PER DAY



When Bussen Quarries Inc., at Jefferson Barracks, Mo., were met with heavy demands for riprap in river flood control projects, they had to overcome the high labor costs and low-tonnage yield of old-fashioned hand methods. So they did it the easy way . . . with Simplicity Gyrating Screens. They set up an auxiliary "one-man" riprap operation that mechanically produces up to 500 tons of riprap per day. Material from the crusher is conveyed over a 4' x 12' heavy-duty, double-deck Simplicity Screen, with 6" and 2" openings. A 25-ton surge bin receives the oversize—or riprap—and delivers it by conveyor to a steel chute for truck loading. Wear, parts replacement, and other maintenance costs are negligible. Two additional Simplicity Screening Units—double and triple deck models—efficiently screen the product passed on from the riprap operation. Simplicity Gyrating Screens are available with 1, 2, 3, and 4 screens in sizes from 2' x 3' to 5' x 14'. Send us your screening requirements and we will recommend the model specifically suited to speed and simplify production for you.

- SALES REPRESENTATIVES IN ALL PARTS OF THE U. S. A.
- FOR CANADA: CANADIAN BRIDGE CO. LTD., WALKERVILLE, ONTARIO
- FOR EXPORT: BROWN & SITES 50 CHURCH ST., NEW YORK 7

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICHIGAN

Rocky's NOTES

Nathan C. Rockwood

Legislation Replaces Administrative Law

REGARDLESS of their political party affiliations we believe that any business man, who has studied or will study the accomplishments of the first session of the 80th Congress, can not avoid the conclusion that it really took some definite steps toward a return to representative government. By passage of the Portal-to-Portal Pay Act and the Labor-Management Relations Act, this Congress went a long way to abolish some of the most obnoxious features of the kind of administrative law that had gotten a firm grip in this country since the first Roosevelt administration, and was getting more firmly entrenched all the time. Ever since 1933 our Congresses year after year issued not only blank checks for administrative expenditures, but passed legislation setting up administrative commissions and bureaus pretty largely empowered to write their own laws, rules and regulations, and to administer these laws as they saw fit, regardless of normal judicial procedures and legal restraints. The excuse for this, that the country was faced with one crisis after another, and time was too short to tackle these problems in any other way, has been worn out.

A Government of Laws Not of Men

Few people who have not made a study of constitutional government realized how far we were departing from the kind of a republic the founders tried so long and so conscientiously to establish in this country. They had provided every safeguard that they could think of to assure that the government of the United States should be a government of laws and not of men. They fully realized that the government of a benign sovereign was the best of all governments, but they knew the weaknesses of mankind, and that such governments are temporary and hazardous. George Washington might have been such a sovereign had he been vain and less firm in his belief in representative government.

Thus, at least, we owe it to the 80th Congress and perhaps to fortuitous circumstances, that constitutional government has again triumphed in this country. By abolishing some of the various emergency executive agencies and curtailing the high-flying careers of others, we are on the road to a return of a government of laws and not of men. The experience of the past 14 years has been very enlightening and every good citizen should take a little time out to study its effects, particularly the younger generation which has come of age without any actual experience under any other kind of government.

Law-Making Administrators

It isn't possible here to review in any detail the abuses that grew up under this kind of administrative law, but they are all illustrative of the inherent danger of any departure from a government of laws. To begin with, the men appointed by the President to administer the Fair Labor Standards Act and the National Labor Relations Act were naturally of his political faith and beliefs. They considered themselves crusaders in the cause of organized labor to right the alleged wrongs of years of employer dominance. Consequently they took advantage of every changing condition to forward the cause of organized labor dictators against every right of the employer and the individual worker. Early court decisions, unfortunately, strengthened their position, and they changed their rulings and decisions to reach farther and farther into the intricate details, and the pocket-books, of industry employers.

Rulings were made and these were adhered to by employers in entire good faith, only to be informed at some later date that the administrators had changed their minds and the employers were liable for back wages and penalties which would have bankrupted many businesses. If the administrators always had been patriotic, intelligent and broadminded men, instead of zealots, the scheme might have worked longer, regardless of its innate danger to our constitutional government, but fortunately or unfortunately such men are rare in public life and few appeared on the scene.

Perhaps the outstanding example of the effect of administrative law, and one that did more than anything else to arouse public sentiment, was the National Labor Relations Board's attempt to abridge the free-born American's right to freedom of opinion and of speech. The N.L.R.A. was fairly definite on this, and it is open to doubt if even the Congress that adopted the Act had any intention of seriously abridging the right of freedom of speech specifically guaranteed in the Constitution. The Act merely provided that an employer was not to use coercion or promise of reward in any attempt to influence the choice of union bargaining representatives.

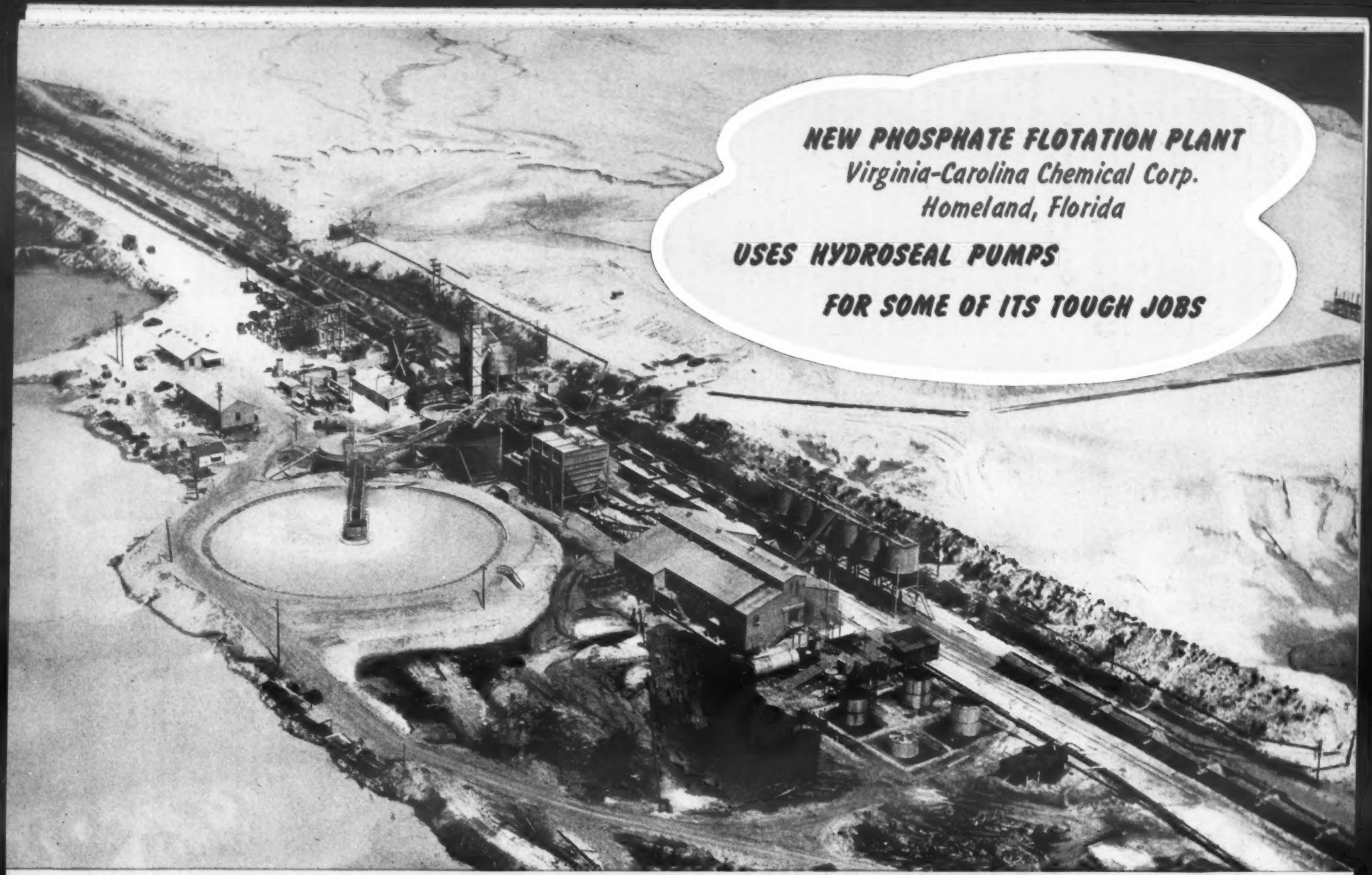
Curb on Free Speech A Good Example

The Board, however, immediately began looking back into the record of the challenged employer, and if it were found that there was any act or expression on his part from which it could be shown he had once had a "hostile" attitude toward organized labor, the conclusion was drawn that his most innocent expression of present opinion was per se coercion. The new Labor-Management Relations Act consequently forbids this practice of the Board, and henceforth there is to be no evidence of coercion unless contained in the expressions, written or oral, in the particular instance under investigation. The Board had already felt some of the repercussions of its earlier decisions and had already begun to liberalize its stand on freedom of speech by the employer, but we are far better off to have it set right by the law of the land.

Honest Bargaining Elections

Another example of the Board making laws entirely unjustified by a fair interpretation of the N.L.R.A. was the method adopted of deciding elections for union bargaining representatives. The Act merely provided that the representatives were to be selected by a vote of the majority of the employes in a unit appropriate for the purpose. The law did not specify that this unit must be national or international union, or a union affiliated with any other. Yet of its own volition the Board proceeded to disqualify many long established independent company unions on the pretext that they were employer dominated. Probably some were, but by no means all. Again the Board took it upon itself to rule that a majority of employees meant only a majority of those voting in the election. Thus many unions were crammed down the throats of employees who were apathetic to any union.

The new L.-M.R.A corrects these usurpations of law making by the Board, and reëstablishes the meaning that any fair-minded man would have given the language of the original N.L.R.A. A majority of the employes means just that, when it comes to compelling membership in a labor union; and independent unions are placed on an equality with C.I.O. and A.F. of L., etc., which have long been alleged spokesmen for all labor.



NEW PHOSPHATE FLOTATION PLANT

Virginia-Carolina Chemical Corp.
Homeland, Florida

USES HYDROSEAL PUMPS

FOR SOME OF ITS TOUGH JOBS

ALLEN-SHERMAN-HOFF CO., 1435 Locust St., Phila 2, Pa.

Hydroseal, Packless and Maximix Designs are Covered by Patents and Applications in the Major Mining Centers of the World.

REPRESENTATIVES IN MOST PRINCIPAL CITIES

the Personal Side of the news

General Sales Manager

VERNON W. BARLOW, formerly assistant to the general sales manager of the Missouri Portland Cement Co., St. Louis, Mo., has been appointed

Vernon W. Barlow

general sales manager for the Monarch Cement Co., Humboldt, Kans. For nine years prior to joining the Missouri Portland Cement Co., Mr. Barlow was an engineer for the Portland Cement Association in Wichita, Kans., and traveled extensively throughout Kansas assisting architects, engineers and contractors in the design and construction of all types of concrete pavements, buildings, bridges and public improvements.

Elected Vice-President

FERGUS A. IRVINE, who has been engaged in research and production work with The Celotex Corp., Chicago, Ill., since 1925, has been elected vice-president in charge of production. P. D. WALSH continues as general traffic manager, and HARRY B. CLEVELAND, formerly assistant in the purchasing department, has been appointed general purchasing agent, succeeding James W. Franklin who has been named director of purchases and traffic. RICHARD H. THOMPSON, formerly assistant secretary, has been appointed assistant to the president.

Association Secretary

COL. HARRY E. BLAKELY has assumed the position of executive secretary of the Mississippi Highway Contractors' Association, Jackson, Miss., which is an affiliate of the American Road Builders' Association. Col. Blakely, just returned from 56 months in the European theater of operations, spent the past six months with the A.R.B.A. in Washington, where he was acting managing director of the contractors' division, as a "refresher course" in organization work. He is an alumnus of Georgia Tech in civil engineering, and taught that subject for four years at the University of Tennessee. Later he was employed by the Tennessee Highway Department on location jobs, bridge work and other road construction projects. He also superintended construction jobs in Kentucky and was for a time, field engineer of the Penn-Dixie Cement Corp.

Joins Consulting Concern

R. C. RIED, formerly with the Valley Forge Cement Co., Catasauqua, Penn., and more recently with the process division of the General American Transportation Corp., has resigned to join Knowles Association, New York, N. Y., a newly formed consulting and designing engineering firm.

Research Chairman

LEON H. BEEGHLY, president and a director of the Standard Slag Co., Youngstown, Ohio, has been elected chairman of the board of the American Businessmen's Research Foundation, which he has served as a director since 1932. T. Morton McDonald, attorney, was elected president.

Assistant Production Manager

EDMOND B. HOLLINGSWORTH, manager of the York, Penn., plant of the National Gypsum Co., Buffalo, N. Y., has been promoted to assistant production manager with headquarters at Buffalo and will assist in the administration of the production program in all plants. Mr. Hollingsworth, who has been with the company since 1936, started as a laborer in the Clarence Center plant. He has been succeeded as manager of the York plant by William W. Wallace of Chicago.

Edmond B. Hollingsworth

Sales Representative

PAUL C. BLOUNT, formerly sales engineer with the National Lime and Stone Co., Findlay, Ohio, has been appointed sales representative in the Zanesville area for the Universal Concrete Pipe Co., Columbus, Ohio. Prior to that, he was district sales manager for the Standard Slag Co., Steubenville, Ohio. Recently he was sales representative for the American Rolling Mill Co. in southeastern Ohio.

On S. D. Cement Commission

E. H. KUHLMAN of Menno, S. D., has been reappointed by Gov. George T. Mickelson to the South Dakota State Cement Commission for a four-year term effective July 1. Mr. Kuhlman was first appointed in 1946 to complete the term of John Graber, who resigned.

Appointed Manager

HAROLD J. SCHOLTEN has been appointed manager of Brewer's City Coal Dock, Holland, Mich., according to a recent announcement by C. Brewer, owner. Mr. Scholten was formerly with the Associated Truck Lines, Inc. Brewer's City Coal Dock produces and sells sand and gravel, and is a large distributor of coal and cement; a bulldozer and crane service also is available.

P.C.A. Engineer

ROBERT E. TOBIN, district engineer for the Portland Cement Association, has reopened the Spokane, Wash., office of the Association covering eastern Washington and northern Idaho. Mr. Robin is a former professor of civil engineering at Gonzaga University at Spokane. He is a graduate of the University of Wyoming and secured his master's degree at Iowa State College, Ames, Iowa. His previous experience included employment by the public roads administration at Yellowstone National Park, and he was one of the designing engineers for the Farragut Naval Station.

Community Chest Chairman

HARRIS N. SNYDER, vice-president of the Buffalo Slag Co., Buffalo, N. Y., and president of the Federal Crushed Stone Co. and the Federal Portland Cement Co., has been appointed chairman of the special industrial division for the 1947 Community Chest campaign in Buffalo.

REPRESENTATIVES IN MOST PRINCIPAL CITIES
and Applications in the Major Mining Centers of the World.

Raymond W. Haugh

William U. Townsend

David H. Shearer

National Gypsum News

WILLIAM H. TOWNSEND has been appointed assistant manager of the industrial division of the National Gypsum Co., Buffalo, N. Y. Raymond W. Haugh has been named manager of industrial lime sales; Walter S. Hamme, manager of agricultural sales; and David H. Shearer, manager of Eastern district industrial sales. Richard H. Means has been appointed assistant controller and Frederick A. Wagner as auditor.

25th Anniversary

LLOYD CORSER, general manager, and A. H. STOVALL, manager of the ready mixed concrete plant of the Saticoy Rock Co., Ventura, Calif., were recently presented with watches as a token of appreciation for their 25 years of service with the company. Both men came to the company during its first year of operation and have aided in directing it to its present position. Company officials include Q. W. Best, president; Fred W. Smith, vice-president; Robert Mitchell, secretary; John Lagomarsino, treasurer; and Vic Parker, assistant secretary. B. McClure, who has been with the company 19 years, is plant manager; Jack Smart is sales manager and E. L. Schell is in charge of the garage and transportation department.

Walter S. Hamme

Associate Editor

FOREST M. PESTER, formerly assistant editor of personnel publications of the Minnesota Mining and Manufacturing Co., St. Paul, Minn., has been appointed associate editor of Construction Bulletin.

A.S.C.E. President

RICHARD E. DOUGHERTY, vice-president of the New York Central Railroad, White Plains, N. Y., has been nominated as the 1948 president of the American Society of Civil Engineers.

Named President

RAYMOND A. WETZLER has been elected president of the Whitehall Cement Manufacturing Co., Philadelphia, Penn.

Traffic Manager

ARTHUR H. MILLER, a veteran of World War II, has been appointed traffic manager for the Genesee Sand and Gravel Co., Buffalo, N. Y.

Lloyd Corser and A. H. Stovall, center, are shown being presented with watches by John Lagomarsino, front left, and Fred W. Smith, front right. Company officials grouped behind from left to right are Q. M. Best, Jack Smart, Harry Jumper, J. C. Buckbee and Robert Mitchell

New Association Officers

RALPH H. ANDERSON, engineer for W. E. Anderson Sand Co., Columbus, Ohio, has been elected president of the Ohio Ready Mixed Concrete Association. STEPHEN STEPANIAN, vice-president of the Arrow Sand and Gravel Co., Columbus, has been named treasurer; CLAUDE L. CLARK, secretary; and R. P. MUMFORD of Springfield, Ohio, vice-president. At a joint session with the Ohio Sand and Gravel Producers, V. P. AHEARN, executive secretary of the National Ready Mixed Concrete Association and the National Sand and Gravel Association, discussed federal legislation affecting the sand and gravel and ready mixed concrete business. WILLIAM EDWARD HOLE, president of the Ohio Sand and Gravel Association, presided at the meeting.

Elected Honorary Director

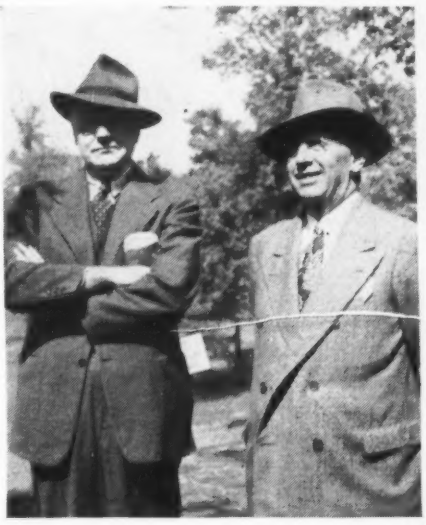
NATHAN C. ROCKWOOD, editorial consultant and for over 26 years editor of ROCK PRODUCTS, was elected the first honorary member of the Board of Directors of the National Sand and Gravel Association at its recent meeting at French Lick, Ind. President Coolidge of the Association, presiding at a luncheon meeting, made the announcement of the proposed action and introduced Robert Mitchell, past-president, who made a very complimentary talk about Mr. Rockwood's long and conscientious services to the industry (and said many other nice things) and then moved to elect him to the first honorary membership on the Board of the Association in its entire history. The motion was carried unanimously. Mr. Rockwood said in response that what he had done was only in the line of duty, and that if the members of the Board believed it was well done, it made him more than happy; he would always consider the honor bestowed upon him by the Board, one of the greatest that could possibly come to him.

On Harvard's Faculty

STANTON WALKER, director of engineering and research, National Sand and Gravel Association and National Ready-Mixed Concrete Association, has been signally honored by being appointed a member of the faculty of Harvard University's post-graduate engineering school. Mr. Walker was selected a year ago to give a lecture course at Harvard on the design of concrete, as a visiting lecturer. He is now one of only a few such lecturers who has been made a regular member of the faculty. It is said that his lecture course of last year was voted by students the most popular of a series. Of course, this does not mean any change in his other duties, as the course requires only about a week of his time, but it is a notable recognition for both the man and his service to the concrete and aggregate industries.

Honor Inventor of Ready Mix Truck

STEPHEN STEPANIAN, vice-president, Arrow Sand and Gravel Co., Columbus, Ohio, received recognition as the inventor of the motor-truck concrete



Stephen Stepanian, right, with Stanton Walker

mixer and as the daddy of the ready-mixed concrete industry, at the recent meeting of the Board of Directors of the National Ready-Mixed Concrete Association at French Lick, Ind. The new research fellowship on concrete to be established by the Association at the University of Maryland will be known as the Stephen Stepanian Fellowship. The announcement was made by Alexander Foster, Jr., past-president of the Association, who recalled Mr. Stepanian's design of a truck mixer years before any one else had conceived the idea (ROCK PRODUCTS, April, 1941). His application for a patent was turned down by the U. S. Patent Office in 1917, partly perhaps because Steve was a recent immigrant and then still a legal subject of the Sultan of Turkey (he is an Armenian by birth), and partly probably because he was not well informed about the proper steps to take to appeal the decision of the patent office examiners. The application was denied, according to the examiner's report, because "there was no novelty in a concrete mixer on wheels which could be moved from job to job." Nevertheless Steve's original design embodied all the essential features of the present-day truck mixer. The patent for the motor truck mixer was subsequently granted to a Kansas City, Mo., man named Bickel. His design closely paralleled that of Mr. Stepanian, who had first developed the idea in 1914. So, after 33 years of long and faithful work in pioneering the ready-mixed concrete industry in the United States, Steve, one of the finest types of the American citizen, is recognized by the industry.

Engineering Consultant

WILLIAM H. KLEIN, formerly vice-president and general operating manager of the Pennsylvania-Dixie Cement Corp., New York, N. Y. has joined the staff of Gilbert Associates, Inc., engineers and consultants, New York, N. Y., as chief consultant on engineering and operating problems pertaining to the cement and rock products industries. He will make his headquarters in Reading, Penn. In 1946 Mr. Klein resigned as vice-president of the cement corporation to enter private consulting practice. He is a graduate of the University of Michigan with a degree in chemical engineering. He is a member of various technical societies and at present is a member of board of directors of the American Concrete Institute.

OBITUARIES

WALTER F. JAHNCKE, vice-president and treasurer of the Jahncke Service, Inc., New Orleans, La., and for many years a leader in the building supply field in the South, passed away July 21. He was 66 years old. Mr. Jahncke was formerly president of the National Builders Supply Association and life president of the Southern Builders Supply Association. In 1932 he was decorated by King Haakon VII of Norway as a Knight of St. Olav, first class, for his services to Norwegian interests in Louisiana.

EDWARD R. CUSHING, formerly associate editor of ROCK PRODUCTS, died August 5 from injuries suffered when struck by fragments of an exploding air line valve in a sewer tunnel under construction at 41st and Exchange Ave., Chicago. At the time of his death Mr. Cushing was a mining engineer for S. A. Healy Construction Co. in Chicago. He is survived by his wife, Cleo.

OWEN MCKAY, superintendent of the Stewart Sand and Material Co., Kansas City, Mo., passed away recently. He was 59 years old and had been a plant superintendent for the company since 1918.

JOE A. MARTIN, retired co-founder of the Austin White Lime Co., Austin, Texas, died recently. He was 80 years of age.

LESLIE L. MOHR, a gravel plant operator at DeGraff, Ohio, died August 4 at the Mary Rutan Hospital, Bellefontaine, Ohio. He was 54 years of age.

FRED D. CAVANAUGH, owner of a sand and gravel business at Renton, Wash., died July 31.

Known by the Promises it *Keeps*

- ★ **A Practical High in Fractional Efficiencies**
- ★ **Most Work per Dollar in Overall Costs**
- ★ **Next to No Maintenance**
- ★ **Next to No "Wear Out"**

Ten years and more of Buell van Tongeren Cyclone performance in dust control and recovery, in a wide spread of American industries, lays indisputable evidence on the line.

The principle of the cyclone is essentially simple. But it remained for the van Tongeren patent to add real operating efficiencies in handling dust particles of micron-size fineness.

Here for all to see is the unique Buell cyclone . . . with practical operating efficiencies a matter of Industry record.

To every engineer and businessman currently devoting time and thought to a particular problem of dust control or recovery, we offer the Buell fund of practical information. A most useful engineering perspective will be opened up by a study of our new book "Engineered Efficiency in Dust Recovery". A copy is yours for the asking. Write: Buell Engineering Co., 2 Cedar St., Suite 5000, New York 5, N. Y.

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Engineered Efficiency in **DUST RECOVERY**

Association NEWS

ALL associations serving the rock products industry have alerted their membership to the strong probability of another freight rate increase. A large part of the production in these industries moves by rail, and an increase in freight rates will necessitate a further increase in the price of these products. The railroads cannot continue to maintain service if income is not sufficient to meet advancing labor and material costs, but the rock products industries may be faced with a decision to divert more tonnage to truck haulage or disperse plant operations to counter-balance a boost in freight costs. Even where production is largely moved by truck, a general increase in freight rates will be reflected in higher costs of machinery and supplies.

Agricultural Limestone Program Approved by Congress

After weeks of uncertainty following deep cuts made in the Agricultural Conservation Program by the House, the Senate finally restored most of the appropriation and the conference committee finally agreed on an appropriation of $265,653,044 for 1947, and $150,000,000 for 1948. The House originally only appropriated $165,614,290 for this purpose for 1947 and made no commitment for 1948. Many agricultural limestone producers had suspended operations temporarily pending a final decision by Congress, and as soon as the word was passed back that an adequate appropriation was assured, producers resumed full production.

It is significant that the 1948 commitment was reduced to $150,000,000, serving to warn the industry that eventually subsidies for a permanent program will be cut down materially, if not eliminated. With this in mind, the directors of the Agricultural Limestone Division, National Crushed Stone Association at the midyear meeting held at Hot Springs, Va., on July 4, expressed the view that the time has arrived when the industry must stand on its own feet and vigorously promote and sell agricultural limestone. Farmers will be required in 1948 to make a considerably larger cash contribution on all conservation materials and services. The members of the Division have been urged to start immediately to stimulate sales through individual action. Henry Huschke, managing director of the Division, pointed out that a good start already has been made. Over 425,000 copies of two agricultural limestone folders and the invisible ink post cards have been purchased by members; and 150 country banks have requested over 200 sets of the advertising mats, the use of which is publicizing the importance and value of soil liming to the farmers. A new folder entitled "Lime Your Pastures" also is now being distributed. In addition, the Board of Directors has approved the preparation of a series of newspaper ads designed specifically for member-company use. It also was agreed that a series of short radio talks would be prepared for any members who choose to use the air in advertising their product. Another promotional device suggested was the use of films to be shown to groups of farmers and gatherings of farm boys, such as 4-H clubs.

1948 Conventions-Exhibit

Definite plans are now being prepared for exhibits at the coming annual conventions of the National Sand and Gravel Association, National Ready Mixed Concrete Association, and the National Crushed Stone Association and its affiliated group, the Agricultural Limestone Division. The conventions will be held in Cincinnati, Ohio, at the Netherland Plaza Hotel. Meetings of the National Sand and Gravel Association will start on January 20 and close on the 22nd, and the National Ready Mixed Concrete Association will open its convention on January 21, and there will be joint meetings with the National Sand and Gravel Association on the afternoon of January 21 and the morning of the 22nd with the concluding session on January 23. The National Crushed Stone Association will open its convention the following week on January 26 and continue to January 28, with the Agricultural Limestone Division, starting its meetings on January 29 and closing on January 30. The membership of these associations has been urged to make reservations before October 1, 1947.

Industrial Sand Car Supply

Executive Secretary, V. P. Ahearn of the National Industrial Sand Association recently sent out a questionnaire to the membership seeking information on car supply requirements for the third quarter. This report will be sent to Caleb Megee of the Association of American Railroads. The report will also cover the subject of expense of cleaning and repairing railroad cars.

Railroads Request Rate Increase

Railroads have petitioned the Interstate Commerce Commission for a further increase in freight rates. The general increases requested are as follows: within Eastern territory, 25 per cent; within Southern territory, 15 per cent; within Western territory, 16 per cent; Inter-territorially between Southern and Western and Eastern territory, 25 per cent; Inter-territorially between Southern and Western territory, 15 per cent.

In this petition, certain commodities have been singled out for special treatment. Item 274-B, "Sand," covers a request for a minimum increase of 20¢ per ton and a maximum increase of 40¢ a ton. Item 245 and Item 246-A cover "Sand and Gravel," "NOIBN," and the request is for a maximum increase of 20¢ per ton. Industrial sand has been singled out for a substantially larger increase in freight rates than is proposed for a number of commodities, including not only sand, gravel and crushed stone, but bituminous coal, anthracite coal, and iron ore.

Concrete Pipe Load Supporting Capacity

The American Concrete Pipe Association recently issued its Bulletin 73, revealing the results of a survey on Concrete Pipe Load Supporting Capacity. It is a report of a series of full scale tests under normal field conditions, and points out the behavior of concrete pipe when it is laid close to the surface of the ground and subjected to heavy loads applied over a limited area. The tests were first started in 1942, but were discontinued because of the pressure of war work. Since then they have been completed under the supervision of the Technical Problems Committee of the A.C.P.A., headed by E. F. Bespalow, Memphis, Tenn.

N.C.S.A. Moves

NATIONAL CRUSHED STONE ASSOCIATION and its affiliated Agricultural Limestone Division have moved their office to new quarters at 1415 Elliot Place, N.W., Washington 7, D. C.

Stone Producers Outing

PENNSYLVANIA Stone Producers Association and Agricultural Limestone Division held its annual outing August 14th at the Carlisle Country Club.

STOP RUST

This Sure, Simple Way

TEXACO *Rustproof Compound*, applied to exposed metal surfaces, effectively prevents rust. More than that — if rust has already started, *Texaco Rustproof Compound* penetrates it, loosens it for easy removal, and prevents any further rusting.

You simply brush *Texaco Rustproof Compound* on the metal you want protected. It forms a waterproof film, soft and self-healing against accidental scratches or breaks. It does not harden or chip off.

Texaco Rustproof Compound goes on easily and quickly and is easy to remove when your machines go back into service. It is one of the most economical methods of preventing rust.

Stop rust for sure this winter. Get *Texaco Rustproof Compound* and helpful suggestions for its use from the nearest of the more than 2500 Texaco distributing plants in the 48 States. Or write The Texas Company, 135 East 42nd Street, New York 17, New York.

EFFECTIVE PROTECTION FOR METAL EVERYWHERE — Use *Texaco Rustproof Compound* to protect your construction machinery. Gas holders, water works, sewage disposal plants, bridges — wherever metal is exposed to weather or corrosive chemicals and fumes — *Texaco Rustproof Compound* gives protection at low cost. Texaco's 36-page book "Rust Prevention" tells the whole story, offers many money-saving suggestions. Write for your copy today.

TEXACO

TEXACO Rustproofing Products

Tune in . . . TEXACO STAR THEATRE presents the TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

INDUSTRY News

Modernize Quarry

FRANCE STONE CO. has made several important improvements in its North Baltimore, Ohio, quarry. An old locomotive and trackage system of haulage has been replaced by three 6-cu. yd. Koehring dump trucks to haul stone from the quarry face to the primary crusher. A conveyor belt 420 ft. long carries this crusher run stone on an incline above a concrete reclaiming tunnel, building up a huge surge pile. Another conveyor 700 ft. long, emerging from the tunnel under the surge pile carries stone to the screening and secondary crushing plant.

German Potash Report

LATEST FIGURES on potash production in Germany from 1936 to 1944, together with description of processing plants and mining techniques employed in Werra-Fulda and Sud Harz districts (two largest producers in Germany), are incorporated in Information Circular 7405, published by the Department of Mines, Department of the Interior, Washington 25, D. C. Currently, Russian and British zones of occupation control about 83 per cent of total German potash production. During the period under discussion, German potash production rose about 50 per cent, with the bulk of the increase being used in greater than normal applications of fertilizer salts to the soils of occupied countries.

Mexican Cement Plant Opened Recently

CEMENTOS PORTLAND DEL BAJÍO, S. A., Mexico, D. F., was officially inaugurated on July 26, with one of three 10- x 150-ft. kilns in operation. A second kiln was started in August and it is expected to start the third one in the immediate future. Using the dry process, the new plant will produce portland cement exclusively, to be marketed under the trade name of Cemento Leon. Jose Rivera R. is general manager of this 450 metric ton per day installation.

Open Gravel Plant

N. J. NELSON and his son, Milton, have erected a new sand and gravel washing and screening plant near Bancroft river about 3½ miles north of Albert Lea, Minn. A basin has been constructed to impound the water of the river, which will be pumped to the washing plant and returned to the stream above the basin to find its way by filtering through the soil back into the sump.

Plan to Spend $4,250,000 On Air Pollution Control

ELECTRO METALLURGICAL CO., Niagara Falls, N. Y., has launched a two-year program to eliminate 75 per cent of the dust now liberated into the air by the calcium carbide plant. The undertaking is the result of years of extensive study by both company engineers and outside specialists, and will require the building of several new buildings and machines as well as the modernizing of present equipment.

One of the principal sources of dust are the two open-type calcium carbide furnaces, which will be rebuilt as covered furnaces, with the addition of a new covered type furnace. Another source of dust is lime, which is produced as a byproduct of hydrate from the acetylene furnaces. Rotary kilns used for this calcining at the present time will be replaced with two specially designed vertical kilns that are the work of company engineers and Victor J. Azbe, St. Louis, Mo., and which will greatly reduce the dust loss at this point.

The rotary kilns will then be used for calcining limestone, a less dusty operation. Engineers of the Research Corporation, Boundbrook, N. J., are working on the problem of eliminating even this dust

Ideal's Utah Plant Making Progress

UNION PORTLAND CEMENT CO., Devil's Slide, Utah, plant is making rapid progress with the new construction program, and it is expected that the new plant will be in operation in October, 1948. It is a subsidiary of Ideal Cement Co., Denver, Colo. This work includes the installation of two new kilns, 10- x 400-ft., a new wet processing plant, two raw grinding mills and two finish grinding mills. Other facilities include new storage facilities for raw materials, coal grinding equipment, and dust collectors.

Stone and Gravel Company Operates Asphalt Plant

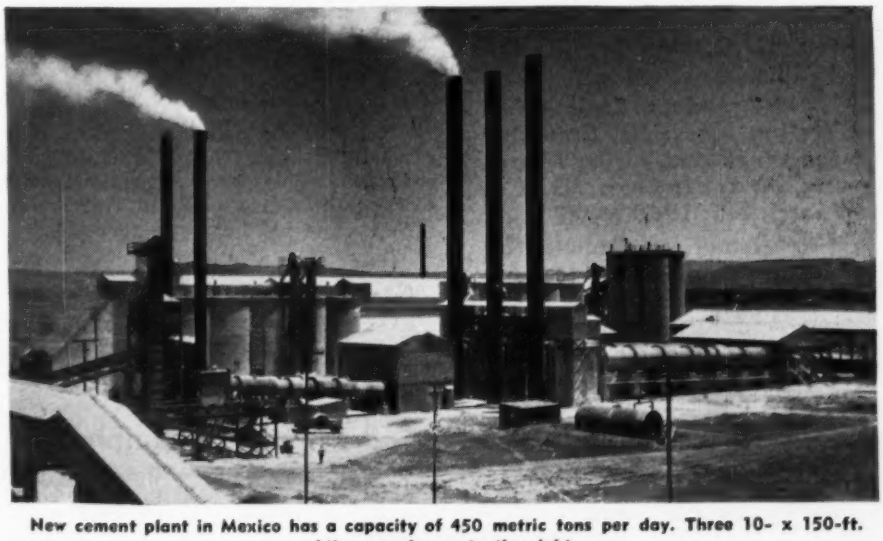
MEMPHIS STONE AND GRAVEL CO., Memphis, Tenn., operates its own Barber-Greene asphalt processing plant at the scene of relocation of Mississippi's Highway 25. This plant produces about 600 tons of black top per day, and is powered by two 133 hp. General Motors Diesels with a fuel cost of under ten cents per ton of finished product.

Floods Cripple Sand Plant

OTTUMWA SAND CO., Ottumwa, Iowa, owned and operated by C. L. Mikesh, was seriously crippled by the floods which engulfed this city. Other plants also were hit but not as severely as this plant. This company made a practice of supplying local residents with information concerning stages of the river and weather reports, and considerable concern was felt by the citizens as to the extent of damage caused this company.

Crushed Stone Gift

L. W. HAYES, Kansas City, Mo., with quarries at Bethany, has given a total of 400 tons of crushed stone to the people of Worth, Mo., whose town was almost completely demolished in a recent tornado. This stone goes forward in freight prepaid cars and is for the purpose of rebuilding homes and places of business.



New cement plant in Mexico has a capacity of 450 metric tons per day. Three 10- x 150-ft. kilns are shown, to the right

Cement Production

BUREAU OF MINES reports that production of finished portland cement during May, 1947, totaled 13,389,000 bbl. or 11 per cent greater than that reported for May, 1946, but 8 per cent below the April, 1947, total. Mill shipments reached 15,328,000 bbl., a figure of 5 per cent below that reported in May, 1946. Stocks of finished portland cement on May 31 were 19,392,000 bbl., an increase of 62 per cent over that reported for May, 1946. The decline in shipments and production in May, 1947, is attributed to the closing of 34 mills in the Atlantic Coast States during three weeks of the month because of labor disagreements. Some of the mills did not start production immediately after the end of the strike because it was necessary to make repairs and reline kilns. Despite the strike bound area, shipments in 10 out of the 19 Bureau of Mines Districts were higher than that reported in May, 1946, and shipments exceeded production in May, 1947, in all but four districts. As cement shipments essentially reflect consumption, this condition indicates a still healthy construction program.

The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of May, 1947 and May, 1946.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	May 1947	May 1946	Apr. 1947	Mar. 1947	Feb. 1947
The month	66.0	59.0	74.0	69.0	68.0
12 months	74.0	61.0	73.0	72.0	71.0

Construction Trends

VALUE of new construction put-in-place during May, 1947, totaled $942,000,000, an increase of 11 per cent over April of this year, but slightly less than the usual seasonal increase. Measured in 1939 prices the level of all new construction (private as well as public) in April was 7 per cent above March, but 2 per cent below April of last year. In comparing May with April of this year, private residential construction, excluding farm building, is up 10 per cent; highway construction is up 38 per cent; but private industrial and public residential construction is down 2 and 25 per cent, respectively.

In comparing figures for April with March, 1947, construction contracts awarded, wholesale prices of construction materials and construction cost index were all up 1 per cent. In the same period, production of portland cement and gypsum board were each up 2 per cent; asbestos shingles, siding and roofing were up 4 per cent; and asphalt roofing materials were up 6 per cent. The foregoing has been abstracted from an Industry Report, Construction and Construction Materials, by the U. S. Department of Commerce, Washington 25, D. C.

Coming Conventions

Agricultural Limestone Division of National Crushed Stone Association, 3rd Annual Convention, Netherland Plaza, Cincinnati, Ohio, January 29-30, 1948.

American Concrete Pipe Association, 40th Annual Convention, Hotel Roosevelt, New Orleans, La., March 11-13, 1948.

American Road Builders' Association, Exposition of new Construction Equipment, Soldier Field, Chicago, Ill., July 16-24, 1948.

California Associated Concrete Pipe Manufacturers, Fall Meeting, Bakersfield, Calif., October 24-25, 1947.

National Crushed Stone Association, 31st Annual Convention and Exposition, Netherland Plaza, Cincinnati, Ohio, January 26-28, 1948. Exposition January 26-30.

National Industrial Sand Association, Fall Meeting, Grove Park Inn, Asheville, N. C., October 1-3, 1947.

National Ready Mixed Concrete Association, 18th Annual Convention, Netherland Plaza, Cincinnati, Ohio, January 21-23, 1948.

National Sand and Gravel Association, 32nd Annual Convention, Netherland Plaza, Cincinnati, Ohio, January 20-22, 1948.

American Road Builders' Association, 45th Annual Convention, Washington, D. C., January 26-28, 1948.

American Society for Testing Materials, Committee Week and Spring Meeting, Washington, D. C., March 1-5, 1948.

American Society for Testing Materials, Annual Meeting and Exhibit of Testing Apparatus and Related Equipment, Book - Cadillac Hotel, Detroit, Mich., June 21-25, 1948.

National Lime Association, Annual Convention, The Homestead, Hot Springs, Va., April 4-6, 1948.

Fires

COLUMBIA QUARRY CO., Columbia, Ill., was damaged to the extent of $300,000 to $500,000 when fire, started by a conveyor belt, swept through the plant. H. C. Krause is president of the company.

LOUISVILLE CRUSHED STONE CO., Louisville, Ky., was partially destroyed by fire recently when lightning struck a power line and sparks carried into the building. Damage was estimated at $60,000.

METROPOLIS SAND AND GRAVEL CO., Metropolis, Ill., lost one building in a fire recently and had a second damaged to the extent of $1500.

California Cement Prices Up

CEMENT PRICES at both northern and southern California mills have moved up 20¢ a bbl. Southern California mills announced price increases in May which placed the Los Angeles price 36¢ a bbl. higher, net mill basis, than in the northern section, and the recent increase in the north is a reflection of higher labor rates recently placed in effect. Cement in paper bags at Los Angeles, before discount, is now $3 per bbl., and the price at San Francisco is $2.84 per bbl. on the same basis. Permanente Cement Co. also has announced new export prices, including $2.67 a bbl., f.o.b. cars or trucks at the mill, for Central and South America, China, Philippine Islands, Hawaiian Islands and for government agencies.

Bessemer Wins Award

BESSEMER LIMESTONE & CEMENT CO., Youngstown, Penn., has been presented the Award of Merit by Financial World in recognition of the company's 1946 annual report. The award was made on the basis of excellence in layout, typography, copy and general appearance of the booklet. The annual report published the usual financial statements, but also many photographs of operations and products and described new company developments and improvements. Meek and Thomas Advertising Agency prepared the booklet.

Buy War Plant

GIANT PORTLAND CEMENT CO., Philadelphia, Penn., has offered $602,000 for the War Assets Administration war-built Ancor plant at Harleyville, S. C. The bid has been forwarded to Washington, D. C., for approval.

Stone Contract

SCOTT QUARRIES, Danville, Ohio, has contracted with Brown County commissioners for road stone at $1.10 a ton.

Sell Wolverine Equipment

WOLVERINE PORTLAND CEMENT CO. assets have been sold to Soper Engineers, a Panama concern, for $490,000 under an order by the Federal

District Court. The plants at Coldwater and Quincy, Mich., will be dismantled and reassembled in South America. Julius H. Amberg, attorney for the trustee, said that some funds would be available for distribution to stockholders.

Eliminate Gypsum Dust

PASSAIC VALLEY SEWERAGE COMMISSION recently withheld action on a request by the Newark Plaster Co., Newark, N. J., to use its facilities for elimination of plaster dust from its plant in Bridge Street. Health officers said expulsion of the dust into the air was a nuisance to the surrounding area and it was suggested that the waste be scrubbed into the sewer system.

Expand Lime Plant

ENTERPRISE LIME CO., Enterprise, Ore., has announced plans for expansion. Rollie Painter, owner, advises that Wylie Hemphill of Seattle, Wash., oil and gasoline distributor, will take 49 per cent of the stock. Installation of a new crusher and screen, and the purchase of a larger rotary kiln are contemplated.

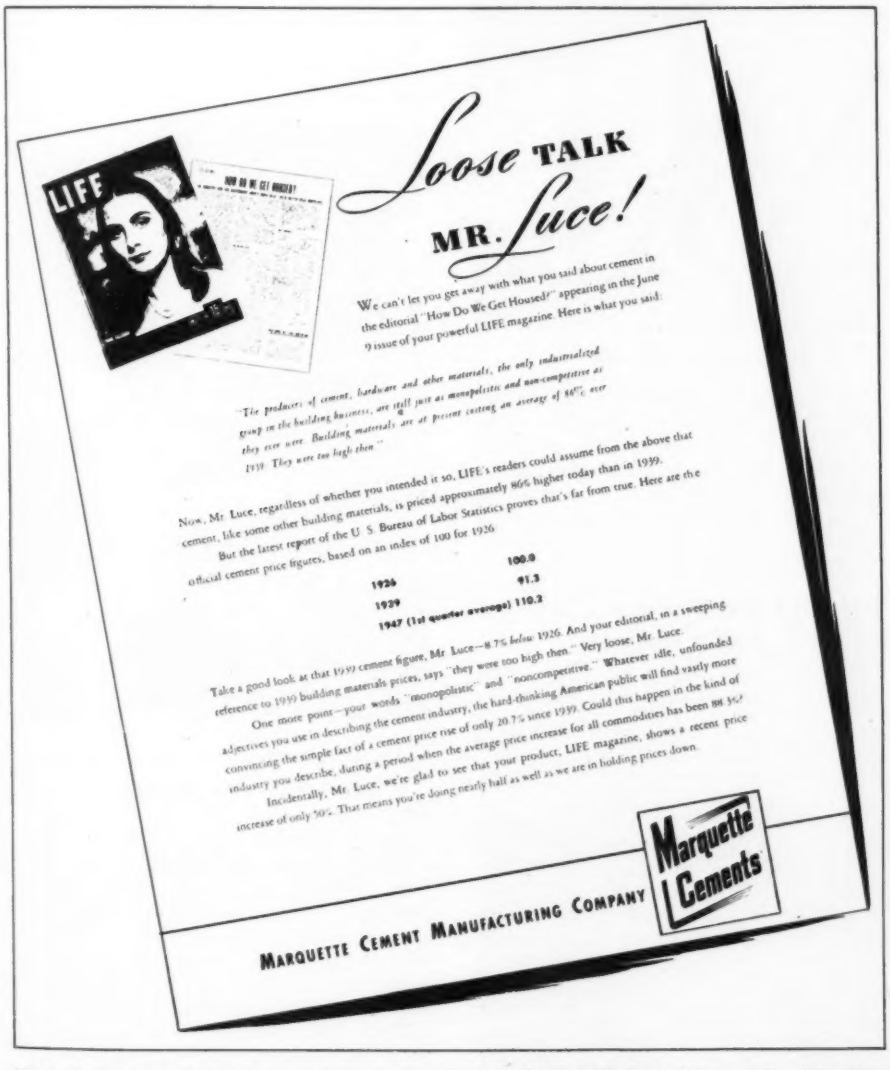
Complete Expansion of Oregon Cement Co.

OREGON PORTLAND CEMENT CO. recently announced the completion of its $1,200,000 expansion program at Oswego, Ore. Daily capacity of plant after completion of improvements totals more than 3000 bbl., nearly tripling the former capacity of 1150 bbl. per day.

Improvements included: an F. L. Smidth rotary kiln 8- x 9- x 287-ft., oil-fired and equipped with Unax cooler; a Cottrell electric dust precipitator; a hammermill; and new finish and raw grinding mills. Two new slurry basins, 36 ft. in diameter and 30 ft. high, were constructed. The old kiln also has been overhauled and repaired, and its capacity increased with the aid of chains at the feed end.

Relocate Plant

HURST SAND AND GRAVEL CO. is now in operation at a new site on the opposite side of the river from its old location just south of Dayton, Ohio. Taking nearly three years to complete the move, first operations were begun at the new location in April. The plant was moved bodily with little new equipment added, though several replacements are planned when deliveries of new equipment become more certain.


LIFE
Loose TALK
MR. Luce!
We can't let you get away with what you said about cement in the editorial "How Do We Get Housed?" appearing in the June 9 issue of your powerful LIFE magazine. Here is what you said:
"The producers of cement, hardware and other materials, the only industrialized group in the building business, are still just as monopolistic and non-competitive as they ever were. Building materials are at present costing an average of 86% over 1939. They were too high then."
Now, Mr. Luce, regardless of whether you intended it so, LIFE's readers could assume from the above that cement, like some other building materials, is priced approximately 86% higher today than in 1939.
But the latest report of the U. S. Bureau of Labor Statistics proves that's far from true. Here are the official cement price figures, based on an index of 100 for 1926:
1926 100.0
1939 91.3
1947 (1st quarter average) 110.2
Take a good look at that 1939 cement figure, Mr. Luce—8.7% below 1926. And your editorial, in a sweeping reference to 1939 building materials prices, says "they were too high then." Very loose, Mr. Luce.
One more point—your words "monopolistic" and "noncompetitive." Whatever idle, unfounded adjectives you use in describing the cement industry, the hard-thinking American public will find vastly more convincing the simple fact of a cement price rise of only 20.7% since 1939. Could this happen in the kind of industry you describe, during a period when the average price increase for all commodities has been 88.3%?
Incidentally, Mr. Luce, we're glad to see that your product, LIFE magazine, shows a recent price increase of only 50%. That means you're doing nearly half as well as we are in holding prices down.
MARQUETTE CEMENT MANUFACTURING COMPANY
Marquette Cements

Marquette Cement Manufacturing Co. answers Life's Mr. Luce with this full page ad, setting him straight on cement prices

Cement Bids

THREE cement companies were awarded contracts totaling $700,000 by Huntington District Corps of Engineers for the Bluestone Dam at Hinton, W. Va., according to an announcement by Lieut. Col. John R. Sharp. These companies were Medusa Cement Co., Cleveland, Ohio, Lehigh Portland Cement Co., Allentown, Penn., and Universal Atlas Cement Co., New York, N. Y. Deliveries between July, 1947 and May, 1948 will total 267,000 bbl.

Pavement Yardage

AWARDS of concrete pavement for July and for the first seven months of 1947 have been announced by the Portland Cement Association as follows:

	Square Yards Awarded	
	During July, 1947	During First 7 Months of 1947
Roads	2,451,646	13,946,056
Streets and Alleys	2,390,292	8,636,770
Airports	169,197	1,008,078
Totals	5,011,135	23,590,904

Build Gravel Plant

MILLE LACS SAND AND GRAVEL CO. started operations four miles north of Milaca, Minn. Bert and Chester Myers are the owners and operators. The plant consists of a 10- x 20-in. jaw crusher, 16-in. rolls, and the necessary screening and conveyor belt equipment. Motive power comprises a 75-hp. Waukesha, a 60-hp. Continental, a 20-hp. Wisconsin, and a 25-hp. Wisconsin motor.

Enders Dam Aggregate

ARMOUR BROTHERS CONSTRUCTION CO., Ogallala, Nebr., has been awarded a sub-contract for delivery of $250,000 worth of gravel to the Enders Dam site, west of McCook, Nebr. Gravel will be pumped from company pits located 60 miles from the dam. Armour Brothers recently completed a similar contract on the Kingsley dam.

Open Quarry

STONY POINT QUARRY, INC., is now in operation near Phillipsburg, Mo. H. E. Ferrier and R. J. Price, both Lebanon, Mo., residents, are partners with Mr. Price as president and Mr. Ferrier as vice-president and engineer. Martin H. Lee is secretary.

Start Agstone Production

CARL G. SWEENEY has completed construction of an agricultural limestone crushing plant at Jasper, Mo., which cost $25,000.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Windmills Operate Barge Pumps

STANDARD GYPSUM Co., of California, obtains its gypsum from San Marcos Island in the gulf of Lower California. A quarry and docks for loading sea-going barges are located on the island, the barges being towed to the plant on the shores of Long Beach, Calif., harbor. These relatively small capacity carriers are soon to be replaced by a self-unloading boat similar to those used on the Great Lakes for handling limestone.

Windmill on barge pumps out bilge water

One novel feature of the barges now in use is that each barge is provided with a windmill which pumps out the bilge water that accumulates below deck. These windmills amidst the busy harbor of Long Beach make an unusual contrast. They were featured recently in the Sunday supplement section of the Los Angeles Examiner.

Conveyor Belt Tightener

SAND in El Paso, Texas, is a cheap commodity and locally established producers are confronted with competition from Mexican sources that sell sand, at times, as low as 10¢ per ton. Deliveries from such sources are not dependable for the sand is usually hand loaded on the Mexican side by cheap Mexican labor and no tariff wall exists. The established producers must sell on a basis of quality and service. Even then the processing must be extremely simple; no washing, simply push the sand to a conveyor belt loading hopper that delivers material to a rotary screen over the loading bins. A tractor and dozer pushes the sand to the hopper.

At the El Paso Sand Products Co. is a simple belt tightener on the plant's only conveyor, shown in the illustration. Its simplicity of design ties in with the entire operation which is designed to compete with the local situation. The small diameter tightener pulley is guided by two channel irons, and a small hand winch with ratchet controls the tension on the return side of the belt.

Winch operates belt tightener

Sturdily Built Pipe Line Carries Away Rejects

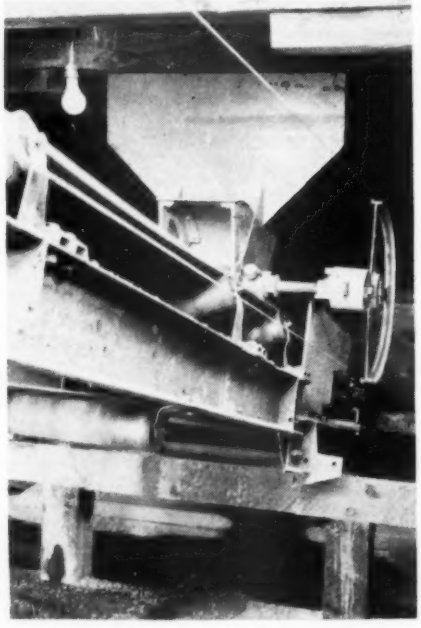
USUALLY the flume or reject line carrying waste water and materials is a neglected phase of the operation. The lines are generally constructed at the last moment of anything that is available with the intention of returning some day and fixing it up right. This seldom happens until necessity compels action.

At one plant in the Southwest, the owners put in a neat 8-in. steel line about 900 ft. long. The line is supported by 4-in. steel tubing with a neat saddle welded to the top to hold the main pipe. Supports are about 10 ft. apart except where a roadway goes under the line. This installation should give no trouble for many years, and will repay the owners for the time and trouble of doing a first class construction job.

Neat, well-built 8-in. pipe line to carry away rejects is supported by steel tubing posts

Gate Feeds Rod Mill

AT PLANT 118 of the Pacific Coast Aggregates Co., near Pleasanton, Calif., a 5- x 10-ft. peripheral discharge Marcy rod mill was recently installed for grinding pea gravel to sand. The bin over the rod mill is fed by a belt conveyor from a large stockpile of this small size gravel.



Cable-controlled gate to feed rod mill

A tractor equipped with a dozer pushes the material to the loading hopper of the belt conveyor. The quadrant type gate feeding the belt was designed by D. A. Gildersleeve, general superintendent, and made in the company shops. On the extended arm of the control shaft has been fixed a grooved one-half pulley so arranged that the amount of feed going up the belt can be controlled from the station near the Marcy mill by means of a small cable that rides in the groove of the pulley.

Increase Life of Launder

OUT on the edge of the desert where materials are not easily obtained, and repair jobs often necessitate shutting down the entire plant, plant operators often use considerable ingenuity to make what they have last longer. These little expedients are often extremely simple and commonplace and many operators overlook them entirely.

Launder lined with old conveyor belting lasts longer and is leak-proof

The illustration shows the rejects from a washing plant going to a settling pond through a V-shaped launder lined with old rubber conveyor belting. It not only makes for a longer life for the launder, but helps make it leak-proof and adds to the stability of the flume.

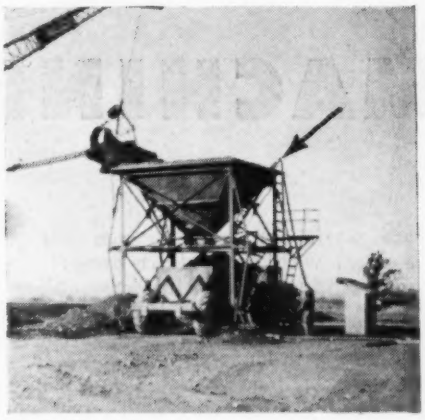
Bucket Elevator Supports

THE HUGH MCMILLAN CONSTRUCTION CO., El Paso, Texas, produces crushed rock for commercial use with two portable plants in operation at the same site. One is a Cedarapids unit and the other a Pioneer, using D-13 Caterpillar Diesel units for prime movers at each plant. Diesel units use on the average about 45 gal. of oil per day.

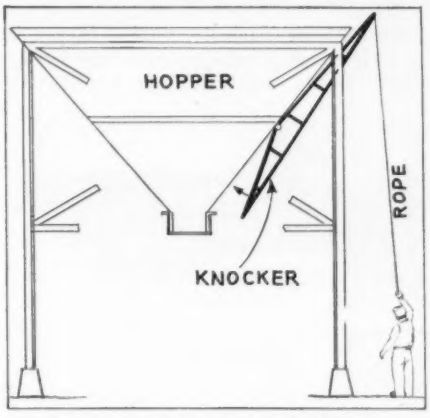
In the illustration may be seen a third Caterpillar Diesel powered 25- x 40-in. Cedarapids primary jaw crusher with the two conveyor belts serving the two portable units. One of the plants delivers a part of the finished product to a bucket elevator serving a wooden truck hopper. The bucket elevator is supported simply by two parallel telephone poles shown in the illustration. The plants produce crushed limestone and operate dry.

Field Hopper Knocker

CALIFORNIA ROCK AND GRAVEL CO. found it necessary to construct a knocker on the hopper of its Pleasanton plant bin to augment the action of an electric vibrator due to the fact that the wet material had a tendency to hang up. The device is built of structural steel and resembles a small truss, hinged to the steel hopper at its apex. The operator, by a vigorous pull on the rope attached to the upper end of the device, brings the low end of the knocker against the hopper with a sharp bang, thus freeing the material.



Knocker being operated (arrow) at the Pleasanton plant of the California Rock and Gravel Co.

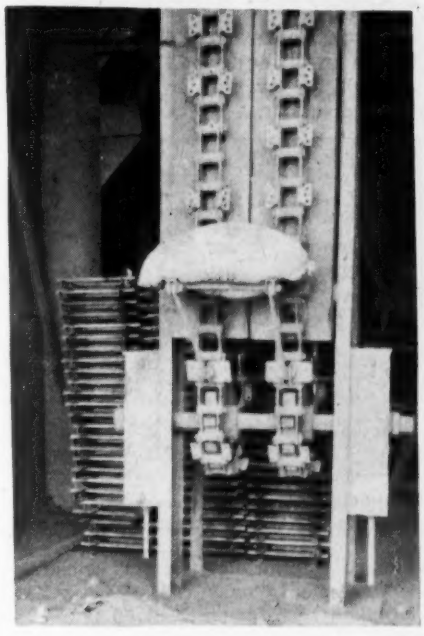


Showing detail of the home made field hopper knocker to facilitate flow of wet material

The gravity return of the knocker affords a second shaking effect when it comes in contact with the upper part of the hopper. A 3-cu. yd. Bucyrus-Monighan dragline fills the hopper, which in turn loads a fleet of Euclid units of 20-ton capacity.

Elevator for Sacked Cement

AT ROSWELL, New Mexico, F. M. Reeves and Sons has a ready mixed concrete batching plant which also serves its concrete block plant. Sacked cement in cloth bags is used. The cement is delivered to the plant from the railhead in trucks, and is elevated to the room adjacent to the batcher floor by an elevator made up from discarded bucket elevator chains. The speed of the elevator is geared down so that it moves slow enough for the men to place the bags on the carriers without stopping the assembly. In the illustration may be seen how the two parallel chains were assembled to make up this convenient sack elevator.



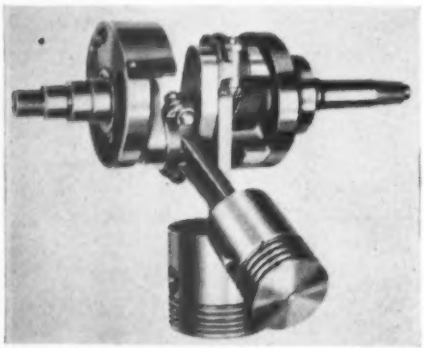
Elevator for sacked cement made from bucket elevator chains

Two telephone poles with cross member support bucket elevator at this plant

new MACHINERY

Crankshaft Reduces Compressor Vibration

DAVEY COMPRESSOR CO., Kent, Ohio, has announced the Equi-Balanced crankshaft invented by Paul H. Davey, president. This crankshaft is



Equal-balanced compressor crankshaft showing two throws with pistons attached

said to spread compressor working strokes evenly over the 360 deg. of crankshaft rotation. In 60 to 105 c.f.m. V-type compressors, the new design employs a two-throw crankshaft with throws spaced at an angle which is the supplement of the V. Heretofore, throws have been spaced at 120 deg., with 60 deg. compressor cylinder arrangements. It is claimed that this new type crankshaft makes practicable the employment of higher compressor operating speeds.

Earth-Mover

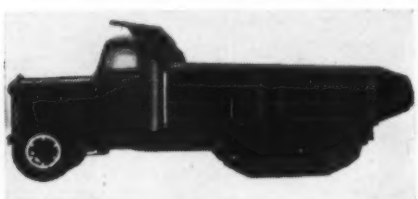
CATERPILLAR TRACTOR CO., Peoria, Ill., has brought out its Diesel DW 10 wheel-type tractor, the No. 10 scraper and the No. 21 cable-control unit. The DW 10 tractor now has a power output of 115 hp. at 1800 r.p.m.

Advantages of the DW 10 over the predecessor model are a 15 per cent increase in power output with the new 6-cylinder engine; improved double-plate, semi-metallic faced clutch; constant mesh transmission; self-adjusting clutch brake to facilitate gear shifting; steering aided by a shockless, worm and bull nut type control integral with hydraulic booster; and heavy duty, air-actuated, mechanically operated brakes with 18-in. brake drum and 7-in. shoes. Top speed of the unit with loaded wagon and scraper is 18.8 m.p.h. with standard transmission and 21.6 or 24.5 with optional transmissions, when equipped with 21.00 x 25 tires.

The No. 10 scraper has been designed exclusively for use with the new tractor. The No. 21 rear-mounted, double-drum cable control is matched to the requirements of the new tractor and scraper.

Heavy Duty Haulage

THE LINN MANUFACTURING CORPORATION, New York, N. Y., has designed a half-track haulage unit for heavy duty industrial haulage known as



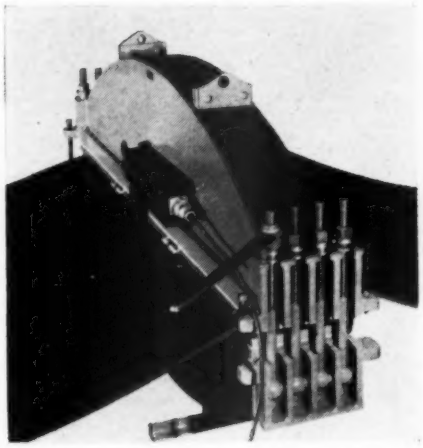
Maximum traction is obtained with half-track haulage unit

Model D-15 Linn Haftrack. With this type of haulage unit, it is claimed that full contour traction for maximum engaged track area and increased stability is obtained. The unit has been used extensively in quarry and mining operations, and is obtainable either with gasoline or Diesel-power equipment.

Belt Vulcanizer

JAMES C. HEINTZ & CO., Cleveland, Ohio, is manufacturing a conveyor belt vulcanizer which is capable of vulcanizing a belt 6 ft. wide. The belt vulcanizer shown in the illustration was made for a coal mining company for a 6-ft. belt.

The huge plattens or "flat irons" each contain over 1000 sq. in. They exert a minimum pressure of 100



Belt vulcanizer designed to vulcanize belts up to 6 ft. wide

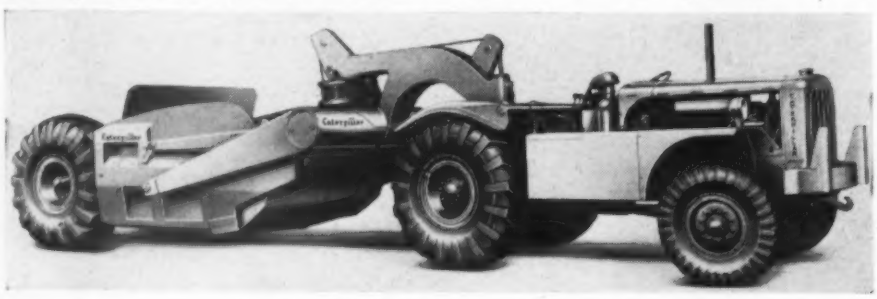
p.s.i., which is said to give a smooth even cure which is necessary to insure a smooth running belt. Platten temperatures of 287 deg. under operating conditions are automatically controlled with a variance of less than 6 per cent at any point of platten area.

Magnetic Pulley

ERIEZ MANUFACTURING CO., Erie, Penn., has developed a self-energized magnetic pulley requiring no electric current to generate a magnetic field.

Magnetic pulley requiring no electric current

It is said that the pulley is adaptable to all applications requiring automatic separation of magnetic from non-magnetic materials conveyed on a belt. Permanently magnetized pulleys are proving increasingly effective ahead of secondary crushers and pulverizers. Slag plants also are using magnetized pulleys extensively to remove iron. The unit will work effectively through belts of rubber, canvas, leather or any other non-magnetic material. Another advantage claimed for this pulley is that the permanent magnetic strength is not affected by electric current variations.



Haulage unit designed for large capacity loads

Shooting Kiln Rings

WESTERN CARTRIDGE Co., East Alton, Ill., has developed an 8-gauge smooth bore gun that fires a 3-ounce lead slug to knock out kiln rings or

Shooting a clinker ring in kiln

break up balled material in cement, lime and refractory rotary kilns. Some use of the gun also is made in open hearth furnaces.

Much time is saved in shooting out kiln rings. The kiln is shut off, and while it is still at operating temperatures, the operator cuts a slot through the ring with a few well aimed shots from the kiln gun mounted on the kiln face or from one mounted on a cart which can be wheeled from one kiln to another. Cutting a slot usually breaks the "arch" in the ring which falls in when the kiln resumes operation. Sometimes several slots or keyways must be cut. Battled material can be broken with direct hits.

High-Speed Tractor Scraper

LA PLANT-CHOATE MANUFACTURING Co., Cedar Rapids, Iowa, has announced its "Moto-Scraper," first addition to the company's line of rubber tired tractors and allied earth-moving equipment. It is a high speed tractor-scraper combination consisting of a two-wheeled rubber tired tractor joined to a 17.5 cu. yd. scraper by a pedestal hitch assembly to form a single integral self-propelled unit.

The tractor is equipped with a 225 hp. Diesel engine and extra large 21 x 29 tires, for maximum traction and flotation. It has four speeds forward and one reverse. Top travel speed is 18 m.p.h. at 1800 engine r.p.m. Tractor has fuel capacity of 104 gal. which is sufficient for 12 to 15 hours operation.

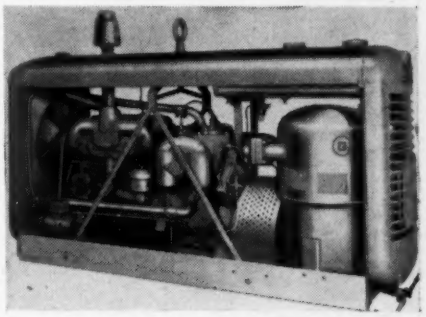
The scraper is a positive forced ejection type, operated by a La Plant-Choate air-actuated cable power control unit, mounted on the rear of the tractor and deriving its power from the main engine.

Steering is accomplished by two double-acting hydraulic jacks which are controlled by a fluid power unit mounted on the front of the tractor. It is equipped with four-wheel brakes, air-actuated, with controls arranged in such a way that braking power can be applied to the scraper wheels alone or to the complete unit. The tractor-scraper has a length of 34 ft. 10 in.; width, 11 ft. 6 in.; height, 9 ft. 8 in.; and a weight of 42,500 lb. Its wheelbase is 21½ ft., and it has a level turning radius of 27 ft. Approximately 70 per cent of the empty weight of the unit is concentrated on its front axle to promote maximum traction and maneuverability.

Self-Contained Compressor

LE ROI COMPANY, Milwaukee, Wis., has announced that it is in production on its "Airmaster" compressor, known as the "105" Utility. Entirely self-contained and light in weight (1700 lb.), it has been specifically designed for either back-of-cab or the platform of trucks. Floor area required is 25- x 82-in. A Le Roi D226 engine is used, featuring replaceable cylinder sleeves, precision bearings, ovrehead valves, pressure lubrication, and magneto ignition.

The liquid cooled compressor is built integrally into the engine block and



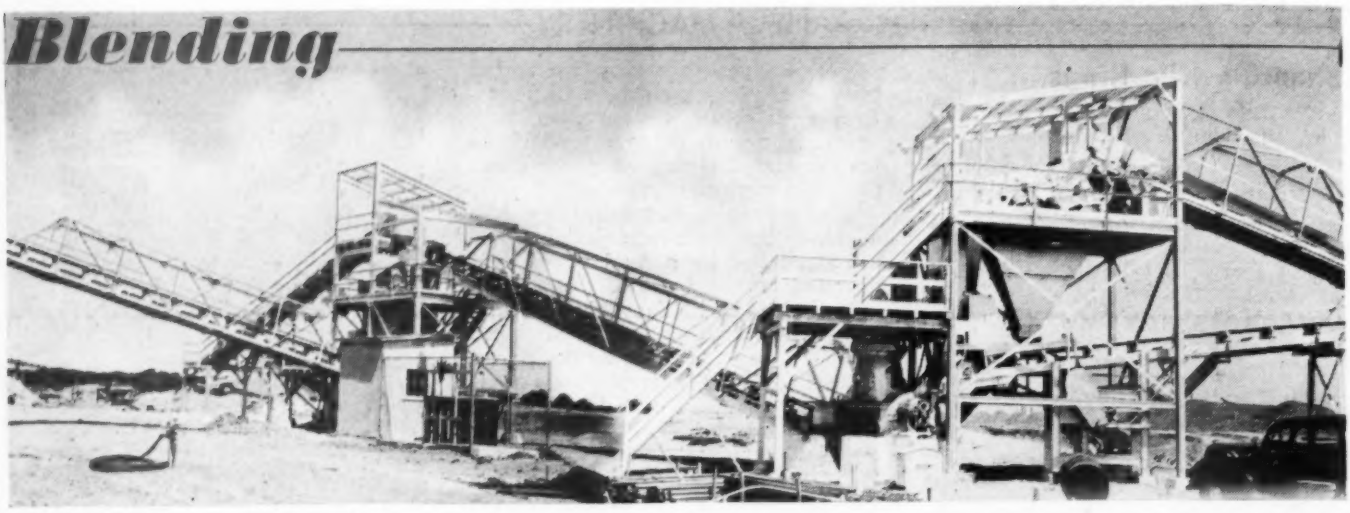
Liquid-cooled compressor built integrally into the engine block

also has replaceable cylinder sleeves and precision bearings. Cylinder head and valves are identical to those employed in the compressor. The compressor is regulated by a patented Econotrol, governing capacity automatically according to the demand for air. A lifting bail, 6-volt electric starting system, and electric hourmeter on a centralized control panel are all supplied as standard equipment.

Welding Electrode For Lightweight Metals

HOBART BROTHERS Co., Troy, Ohio, has designed the No. 13 electrode to simplify welding of light gauge mild steel. Other qualities claimed for this electrode include low penetration, ease of handling and steady uniform transfer of metal. This electrode is designed for use with d.-c. straight polarity or a.-c., and is available in 1/16-in., 5/64-in., 3/32-in., and ⅛-in. diameters.

Action view of tractor-scraper unit with a capacity of 17.5 cu. yd.



Screening and crushing section of road rock unit of plant. Top conveyor, right, delivers rock from surge pile; the lower conveyor returns any unwanted sizes back to one end of same surge pile, and the conveyor to the left delivers material to the road rock final screening plant

Spend Half Million For Aggregates Plant

Pacific Coast Aggregates Co. completes new plant at Tracy, Calif., which has four operating units with large storage capacity for blending

By W. B. LENHART

RECENTLY Pacific Coast Aggregates, Inc., San Francisco, placed into operation its new plant 4½ miles south of Tracy, Calif., one of the operations affected by the large scale modernization program previously announced in ROCK PRODUCTS. Tracy is between San Francisco and Sacramento and the plant will serve that section of the rich San Joaquin and Sacramento river valley. With the economies in operation that this new plant will effect, it may be economical to ship into the Bay District as well. This progressive company has gravel producing plants strategically located in the central part of California, and during the past two years has been carrying out an expansion and rehabilitation program in excess of $3,500,000. A large part of this sum is for the sand and gravel plant being built at Elliot where approximately $1,000,000 will be spent. It will serve the San Francisco-Oakland Bay district.

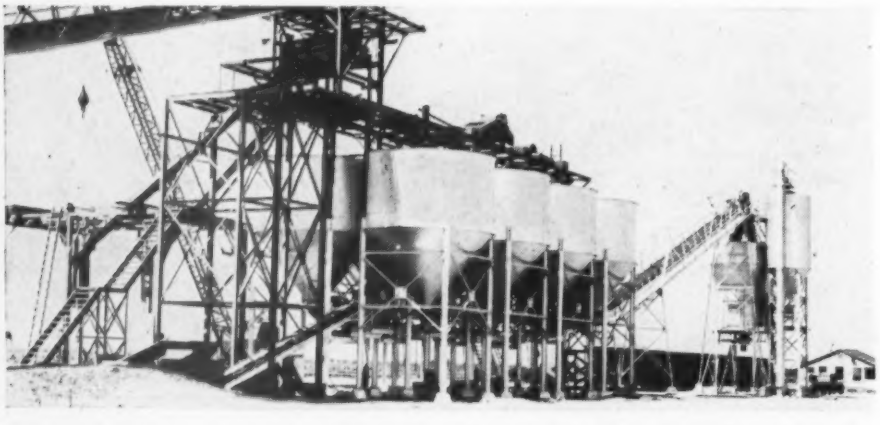
The Kerlinger plant at Tracy is the second producing plant to be built under this program and represents an investment of about $500,000. The company has an older operation about three miles west of the new unit which has been in service many years and, in addition, has a temporary plant alongside the new Kerlinger plant.

Two Surge Piles for Crushed and Uncrushed Material

This new operation at Tracy may be setting a new trend in sand and gravel plant design, especially where plants produce a crushed gravel which is kept separate from the uncrushed gravel. in that it will have two surge piles. One of the surge piles is 50 ft. high with a capacity of 14,000 tons for uncrushed, pit run material, which will serve the road rock plant and the separate washed gravel and sand plant, and the second surge pile will be for the crushed rock with a capacity half as great. Using belt conveyors throughout for transportation, the plant consists of four separate units, each of which can be operated, if desired, independent of the other three groups. The first unit is that which delivers to the main storage pile; the second relates to the road rock plant; the third to the production of washed sand and gravel and for placing crushed rock into the second surge pile; and lastly, the re-crushing, sizing and washing of materials taken from the crushed rock surge pile. The road rock plant operates dry, but the other two screening sections involve washing.

The first surge pile is built in the form of the letter "T" with a 36-in. reclaiming belt conveyor fed from four gravity gates operating in the long leg and serving the washed sand and gravel section. One end of this surge pile (west end) is used for storage of the fines, or unwanted dry sizes from the road rock plant. The short leg of the "T," which carries a 24-in. American reclaiming conveyor belt with four gates, delivers to the road rock plant.

All the gates in the tunnels are of the same general design. The rock flows downward on to a hinged apron connected to the main, stationary gate housing. By raising or lowering the outer edge of this apron by a small hand winch, the amount of rock fed is controllable. These gates may all



Truck loading bunkers obtain material from the main storage bins (14). The bunkers also supply the batching plant

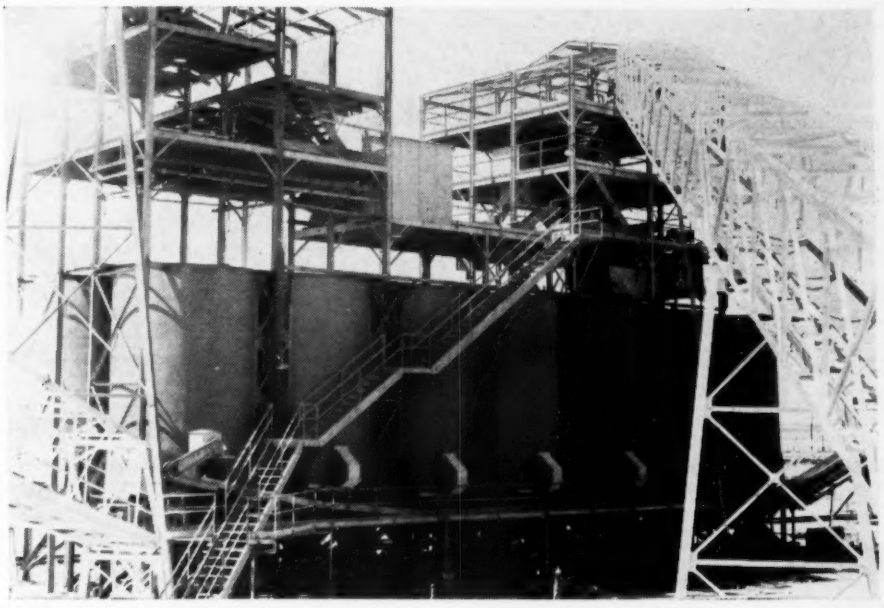
be later replaced by Jeffrey vibrating feeders.

Another rather unusual feature is that all the minus ½-in. material going to the washed sand and gravel section of the plant is run direct from the 6- x 32-ft. rotary scrubber and scalper screen to a large Dorr rake classifier. The overflow from the rakes goes to waste; all the other product goes to the inclined belt conveyor system serving the final screening and washing section.

Deep Gravel Deposit

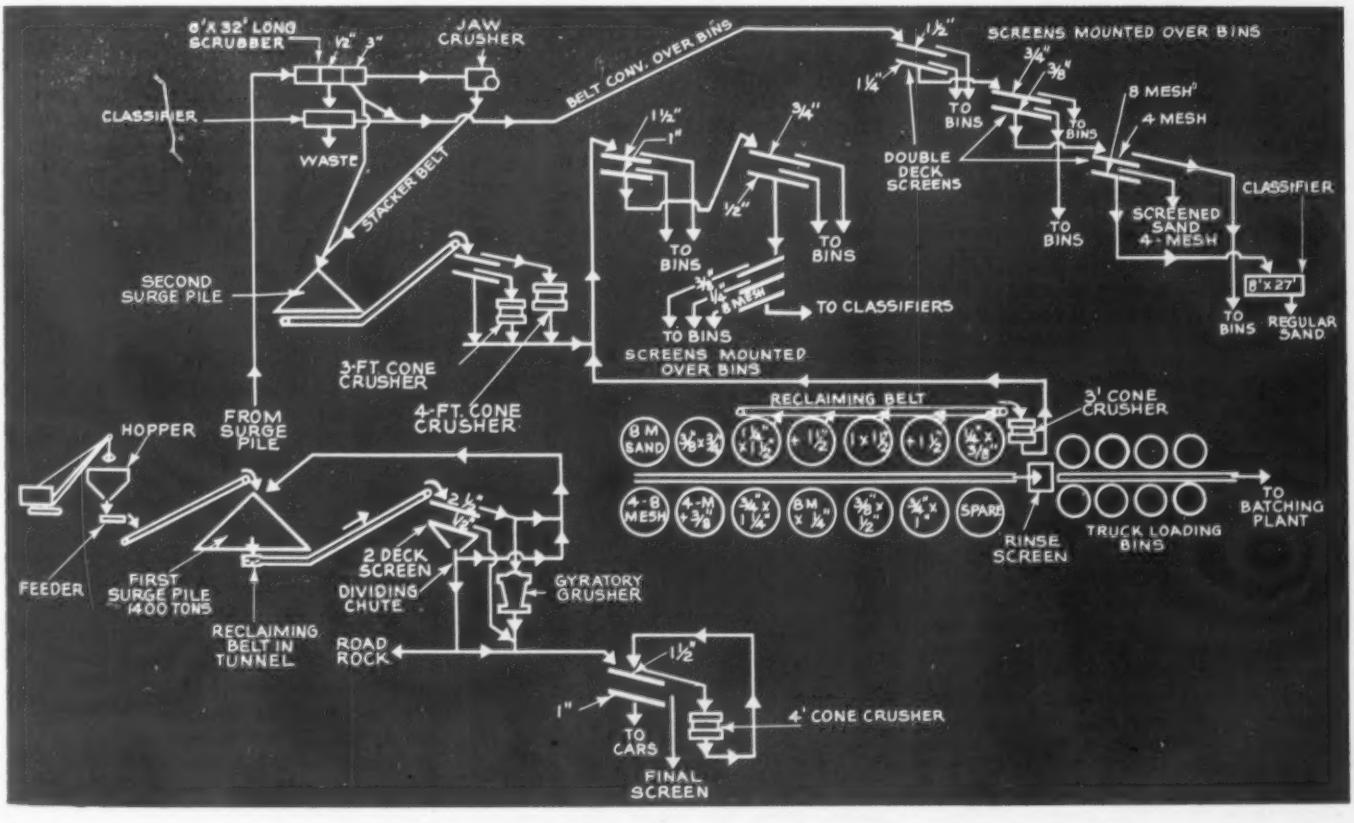
The company owns a square mile of gravel-bearing ground adjacent to the plant which has been thoroughly prospected to a depth of 100 ft. No stripping worth mentioning is needed. The deposit runs about 36 per cent sand with 32 per cent plus 1¼-in. material. There is very little large-sized gravel and a low percentage of pea gravel (.06 per cent of the total). The various products have been tested by local and state authorities and meet every quality specification.

The deposit is ideal from both an economic and quality standpoint. Water is secured from wells drilled to the 500-ft. horizon. These wells were tested before the plant was erected. and testing was carried on during the driest season when one well easily supplied 2000 g.p.m. The Central Valley irrigation project calls for the construction of one of its canals through a corner of the property and the company has granted a 500-ft. right-of-way for the purpose. Later, a tunnel may be driven under this canal and pit conveyors installed so that the gravel in the fraction cut off can be recovered. In any event the canal is an ace in the hole for future water supply as the area does have extreme dry seasons.

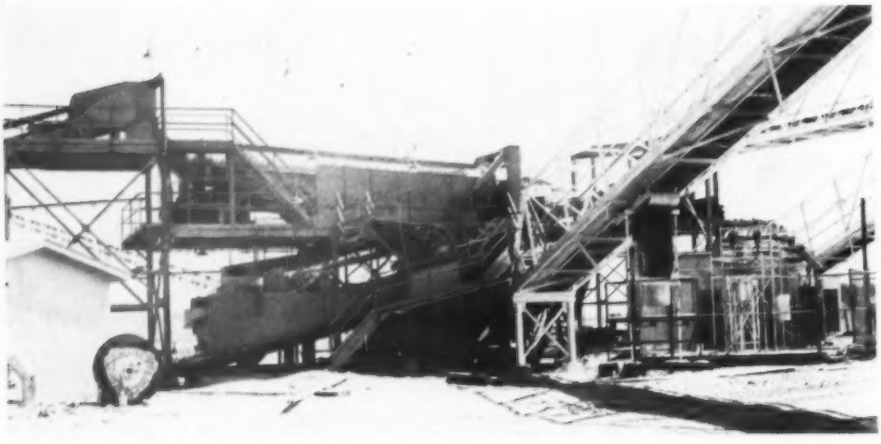


Fourteen steel silos with sand and gravel washing and screening plant at top, right, and crushed gravel sizing equipment at top, left

An impressive feature of the new plant is the arrangement of 22 steel cylindrical storage bins. In one bank there are 14 bunkers arranged in two parallel rows, each bin holding 250 tons. The Tyrock vibrating screens for production of washed gravel and crushed rock are located on top of these silos. These bins were supplied by the Western Pipe and Steel Co. and are used primarily for car loading purposes. For truck loading, there are eight additional cylindrical steel bins with a total capacity of 400 tons. A Noble batching plant with a capacity of 100 yd.p.h. is constructed just east of the truck loading bins.



Flow sheet of operations at Tracy, Calif., plant, showing extensive crushing and screening capacity



Rotary screen and scrubber delivers oversize to crushers, and all the smaller sizes (minus ½-in.) flow to the classifier for desliming

Diesel-electric locomotive of 45-ton capacity for spotting cars

Unit No. 1

Loading is done in the pit at a sub-elevation of 90 to 100 ft. by a 2½ cu. yd. Northwest 80-B shovel. The shovel loads directly to a 60-ton capacity steel field hopper that straddles the main 36-in. pit conveyor belt that delivers to the first surge pile. The belt is fed by a 30-in. x 6-ft. Jeffrey electric vibrating feeder. There is no crusher ahead of this storage.

Unit No. 2

This unit of the plant produces the unwashed road rock. Like all the rest of the plant it is of steel construction throughout, with heavy concrete foundations. The reclaiming belt that serves this plant runs in a 7-ft. diameter corrugated steel tunnel with heavy concrete abutments at the end, and takes the pit run material from the short leg of the reclaiming system and delivers it to a 5- x 12-ft. double-deck Tyrock vibrating screen. The top deck has 2½-in. square openings and the lower deck ½-in. mesh. The oversize falls to a 5K Allis-Chalmers (Gates) gyratory crusher; the plus ½-in., minus 2½-in. rock from the lower deck falls to a 24-in. inclined belt conveyor along with the crusher's discharge and these materials are elevated to a second 5- x 12-ft. Tyrock screen for the final screening. In this little section of the plant there is a high degree of flexibility, for at the first screen a dividing chute is provided so that any unwanted sizes or all sizes can be sent back to the westerly end of the first surge pile via a long stacker belt. And, by changing screens, 2½-, 1½-, or 1-in. road rock can be processed. The second final screen at time of inspection had 1½-in. openings on the top deck and a 1-in. lower deck screen cloth. The oversize from the top deck passes to a 4 ft. Symons cone crusher and the crushed material is elevated back to this same screen by two belt conveyors. The road rock produced is loaded direct to cars.

Unit No. 3

This section produces the washed sand and gravel, the oversize gravel being crushed and sent to the second surge pile. A 36-in. belt conveyor delivers pit run material from the longer leg of the stockpile to a 6- x 32-ft. rotary scrubber and scalping screen. The scrubber section is about one-third of the total length. The center section is of ½-in. round perforations and the end section of 3-in. round openings. The oversize falls to a 10- x 36-in. Farrell-Bacon jaw crusher that discharges to a 24-in. stacker belt serving the crushed rock surge pile. The throughs from the 3-in. openings can also be sent to this pile if desired, or they can be sent to the wet-screening section mounted on top of the 12 steel silos. The minus ½-in. material from the middle section of the scrubber pass to a 2-rake Dorr rake classifier, each rake being 24 ft. long and 4 ft. wide.

Loading 60-ton field hopper with 2½-cu. yd. shovel. Eventually pit will be 90 to 100 ft. deep

The rake classifier discharges to a 30-in. belt that delivers to a 5- x 12-ft. double-deck Tyrock screen (wet) that has 1½-in. screen openings on the top deck and 1¼-in. on the lower deck. The undersize passes to a second double-deck screen having ¾-in. top screen openings and ⅜-in. on the lower screen. Throughs from the lower or ⅜-in. screen pass to a third double-deck vibrating screen having 4-mesh openings on the top deck and 8-mesh on the lower deck. The minus 4-mesh material goes to a bin below and is called screened sand. The fines from the lower deck pass to a second 8- x 27-ft. Dorr rake classifier that produces the regular sand. All other gravel from the other decks drops into silos below. The screened sand and the regular sand can later be blended on the loading belt to meet any grading specifications.

The 14 storage bins are so filled that the larger sizes of uncrushed and crushed gravel fall into the silos nearest the plant proper. On that side of the silos is a reclaiming belt that serves five of these silos so that the larger sizes can, if desired, be sent back to the secondary crusher in the crushed rock section. Seven of the silos are used for the washed sand and gravel. These sizes are: 8-mesh sand, ⅜- to ¾-in., 1¼- to 1½-in., plus 1½-in. (to 3-in.), 4- to 8-mesh sand, 4-mesh to ⅜-in., and ¾- to 1¼-in. The 1¼- to 1½-in. product and plus 1½-in. are returnable to the cone crusher in the crushed rock section of the plant.

Unit No. 4

This is the crushed rock section and its source of material is the crushed rock surge pile where a 24-in. inclined belt conveyor fed from four gates delivers to a 5- x 10-ft. Tyler double-deck (dry) vibrating screen. The meshes of the screens on this unit have not been finally set but the purpose of the screen is to screen out the finer sizes and send them to the washing plant over the 14 steel silos previously mentioned. The rock from the top decks falls to a 4-ft. Symons cone crusher and the material on the lower deck falls to a 3-ft. cone crusher. The crushed material from both crushers drops on to the belt carrying the fines. This conveyor discharges to a 5- x 10-ft. double-deck (wet) vibrating

screen having 1½-in. top deck screen openings and 1-in. cloth on the lower deck. The throughs from the lower deck go to a second 5- x 10-ft. double-deck vibrating screen having ¾-in. top deck screen openings and ½-in. openings on the lower deck for wet screening. The throughs from the lower decks pass to a 5- x 10-ft. triple-deck screen having ⅜-in., ¼-in., and 8-mesh openings on the three decks, respectively. All the plus sizes on all the screens drop into their respective bins. The minus 8-mesh material goes to the Dorr rake classifier located on the ground and at the end of the rotary scrubber-screen. The coarser sizes can be returned to the 3-ft. cone crusher for further reduction and re-screening if desired. The sizes of crushed rock produced are: 8-mesh to ¼-in., ¼- to ⅜-in., ⅜- to ½-in., ¾- to ½-in., 1- to 1½-in., and plus 1½-in.

Between the two rows of six silos are belts for cars, and for filling the truck-loading bins. The bunkers are hopper-bottomed, with the feed to the belt taking off near the top of the cone section through a gate of the type previously described. At the bottom of the cone is a 3-way valve through which the entrained wash waters from the aggregates are drawn to waste. For the finer sizes a rock filter bed has been installed in the cone which can be flushed out (upwards) by water pressure through the 3-way valve. The aggregates going to this belt can be blended if desired. The loading belt dumps to a final rinsing screen near the top of the truck bunkers. The truck bunkers in turn supply the batching plant through an inclined belt conveyor.

The road rock plant has a capacity of 250 t.p.h. and the washed sand and gravel unit is rated at 400 t.p.m. The plant was designed and constructed by Pacific Coast Aggregates, Inc.

The plant is served by the Tesla branch of the Western Pacific railroad, the nearest station being at Carbona.

The temporary plant adjoining the new unit has a capacity of 200 t.p.h.

A 50-ton Whitcomb diesel electric, standard gauge switch engine, powered by two Cummins engines does the switching for both plants.

Official personnel includes: S. J. Goodpastor, vice-president and general manager; R. K. Humphries, assistant general manager; George Hampton, chief engineer; Earl E. Williams, superintendent at Kerlinger plant; L. D. Collins, electrical engineer; J. D. Kaufman, operations manager; and Rudy Schurch, construction foreman.

A World of Aggregate

THE PREMIERE of a new moving picture in natural colors entitled "A World of Aggregate" was shown in Chicago, July 30 to a group of business paper publishers, equipment distributors, contractors, association representatives, etc. The showing, with recorded sales talk, lasts about 35 minutes and represents about a year's work of professional photography and film editing. The exhibitor was the Iowa Manufacturing Co., Cedar Rapids, Iowa, and the host for the occasion, Ken Lindsay, of the Iowa company. The film was prepared under the direction of Russell T. Gray, Inc., industrial advertising agency, Chicago, by H. A. Scribner, president, and Ralph White, of the agency. Mr. White was formerly on the advertising staff of ROCK PRODUCTS.

The film is designed to illustrate the important role of mineral aggregates in the modern world, and in that is unusual. There are numerous industry films to feature concrete highways, railway roadbeds and crack trains, etc., but this film while showing numerous applications of aggregates, including agricultural limestone, is designed to emphasize the preparation of the aggregate, exclusive of cement. A few scenes are shown of permanent commercial plant operations, but the largest part of the film shows the different sizes of completely portable plants made by the Iowa Manufacturing Co.

To those who have not followed closely the development of portable plant equipment, designed to accomplish everything an established commercial plant can do, the film surely has real educational value. Such plants are now available in hourly capacities up to 150 tons, which equals the capacity of many permanent plants. Both sand and gravel and crushed-stone portable plants are included; also portable asphalt paving-mixture plants, which are becoming increasingly popular for the work of resurfacing old pavements.

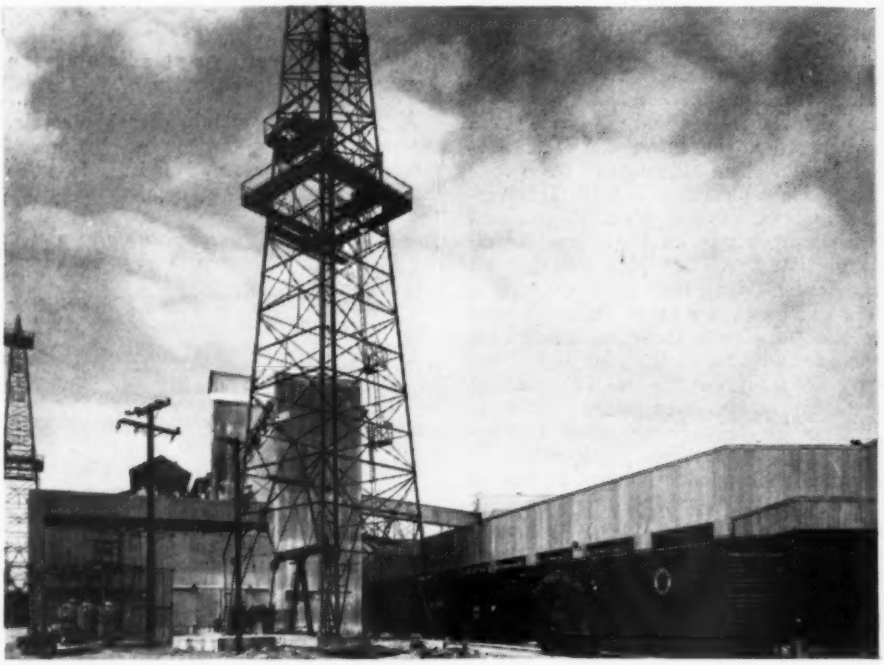
Golden Anniversary Booklet

JOSEPH S. YOUNG, president, Lehigh Portland Cement Co., Allentown, Penn., addresses his employes in an interesting book written to commemorate the company's 50th anniversary. This book is primarily intended for the organization's 3,500 employes. Well-bound and illustrated, printed on glossy paper, Mr. Young's message not only covers the background and beginnings of the company, but also what the company has provided in the way of safety devices and pleasant working conditions for today's employes. The book stresses the need for cooperation and team work by every employe, in every department, in order that the company might prosper and employment and wages remain at a high level.

Group of publisher representatives, equipment distributors, and association representatives viewing moving picture, "A World of Aggregate"

Newest Plaster Board Plant On West Coast

Standard Gypsum Co., Long Beach, Calif., starts operations at modernized plant operated by Henry J. Kaiser and associates



To the right is a portion of the wallboard plant, and to the left is the calcining section. In the foreground is an oil well rig pumping oil so that all available space is much in use at this plant

PROCESSING OF GYPSUM is very old, but it is still interesting and a great deal of pleasure can be obtained from visiting different mills and observing operations. Quite often individuals guard a pet formula or method with a personal satisfaction that they have a secret process all their own, and then at the next mill someone else will be guarding the same secret. After visiting many mills and talking to experts in the business, the conclusion is finally reached that there are few secrets in the gypsum industry.

One of the most recently completed plants is that of the Standard Gypsum Co. of California, at Long Beach, Calif. Organized in 1944 by Henry J. Kaiser and Samuel A. Perkins, president of Standard Gypsum Co., Inc. reconstruction and enlargement of the mill at Long Beach was started soon after the new company was formed. The sacking room was enlarged both in floor area and by the addition of another upstairs floor for the storage of sacked material, fiber, paper bags, etc. Space occupied by the old sack repair house was eliminated to make room for the wallboard plant. New repair shops and change rooms for the men were constructed. At the same time a great amount of pile-driven work was started for footings for the wallboard plant.

Modern in every respect and operating at high efficiency, this new plant is a wonderful help in meeting increasing demands of the building industry. The daily output at present is 300,000 sq. ft. of plaster lath and 150 tons of plaster.

Six rolls of paper form the top and bottom of the plaster board. These rolls are mounted above and over the wet mixers. Monorail overhead facilities handle the heavy rolls of paper

Ship Gypsum by Boat

Gypsum rock from San Marcos Island in the gulf of lower California has an exceptionally high purity which assures easy handling and processing and makes a high quality product. It is transported from the island to the plant by boat. The company has its own dock and unloading facilities and a storage shed for 16,000 tons.

At present rock is shipped to Long Beach via a self-unloading boat similar to those used on the Great Lakes for handling limestone, discharging to a reciprocating pan feeder. A system of belt conveyors and a bucket elevator on the dock deliver the rock to an enclosed storage pile.

Crushing and Grinding Methods

As the gypsum is crushed at the quarry, the rock is much easier to handle in the storage shed. It is moved from the shed by Caterpillar Diesel tractor and dozer to a pan feeder which in turn feeds the rock to a Pennsylvania hammer mill which reduces the stone to pebble size.

Formerly there was a tunnel under this stockpile with a reclaiming belt having reciprocating pan feeders at each outlet, all the gates being operated by a wire rope arrangement. The

Looking from finish end of the wallboard plant toward the mixing end; three strips of plaster board are being made. To the right is the off-bearing end of the dryer

tractor and dozer has proven more satisfactory. To make room for the wallboard plant, the back half of the stockpile area has been eliminated.

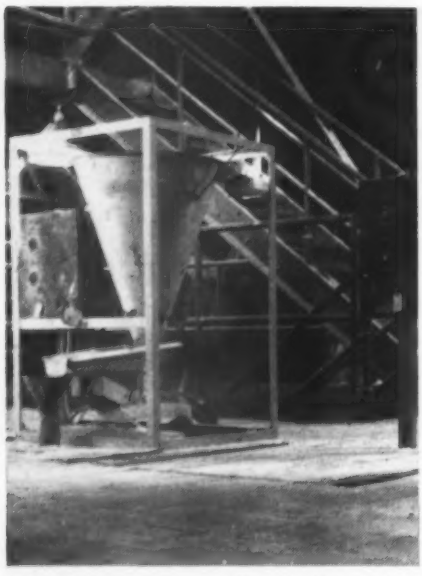
Crushed gypsum is transported on a long inclined conveyor belt to bins over the Raymond grinding mills, the conveyor being unloaded by a Bodinson tripper. Pebble fed to the grinding mills is ground to a fine powder using Raymond cyclone dust collectors and bag filters. The ground gypsum is then ready for calcining.

Calcining

Calcining kettles of 10-ton capacity each are equipped with a gas-fired furnace. In the center of the kettle is a rotating shaft with agitators attached that keep the material agitated during the heating process. About 2 hrs. time is used in calcining one kettle of ground rock, and the temperature rises to between 340 and 350 deg. F. At this temperature the calcined product is dumped into a pit and the kettle is then ready for another batch of rock. As calcination temperature control is important, recording Foxboro pyrometers are provided for each kettle. The calcined ground rock is now called stucco, part of which is elevated to large bins in the top of the mill to be made into plaster and the remainder is conveyed to steel bins in the wallboard plant for making plaster lath and wallboard. For delivery of the stucco to the wallboard storage silos a series of three 8-in. diameter screw conveyors are used. These are mounted in an overhead gallery connecting the calcining section with the wallboard plant. A 10-hp. Westinghouse motor drives each length of conveyor through suitable reductions.

Stucco made into plaster is reground in a Marcy 5- x 20- pebble mill, using a 75-hp. Westinghouse motor. This regrinding improves the working qualities of the plaster. The reground stucco is then conveyed to storage bins over the mixers. The automatic feeder feeds one ton of stucco into a hopper and there the other materials are added to control the working qualities and setting time of the plaster. From the hopper it is chuted into an Ehrsam mixer which thoroughly mixes all the materials, and it is then fed to a bagging machine for packing into 100 lb. paper

This is the wet or stucco mixing end of the wallboard plant



One of the small magnetic vibrating feeders has a conical feed supply hopper

bags which are trucked into a car for shipment. In three hours time a rock can be taken from the shed, crushed into pebble, ground, calcined, reground, mixed, bagged and placed in a car.

Gypsum rock from San Marcos Island is a high quality material averaging 99.6 per cent gypsum, and will not vary over 0.10 per cent from that figure. It is a hard gypsum, and makes a hard wall. It is considered by experts to be one of the best hardwall plasters in the Southwest.

Casting plaster is stucco which, in this plant, is re-ground in one of two 36-in. Sturtevant rock emery buhr mills after which the product is elevated to a Whizzer dust separator, the oversize being returned to the buhr mills. The mills are driven through short-center, flat belt drives by General Electric motors. After the stucco is sacked and aged by storage on the warehouse floor, it is ready for shipment.

A very interesting phase of the work is the quality control. The laboratory keeps a close check on each step of the operation from the storage shed to the customer. The rock is tested for purity; the grinding is checked for fineness. A sample is taken from each finished kettle for testing, and then finally a sample is removed from each mixed batch to see that it has the proper working qualities and setting time.

There are three, 10-ft. Ehrsam kettles having extension tops and pressed steel bottoms. These bottoms have been in service for about 20 years. The kettles were originally installed in the conventional brick work but they are gradually being worked over and the brick-work enclosed in a steel jacket. The kettles fed by screw conveyors are controlled through a hand clutch.

As the plant is located in the heart of the industrial section of Long Beach not far from residential and resort districts, control of dust from the kettles is essential. At this plant a very simple device has been developed for the collection of dust from the kettles. The collector was originally designed by William Senseman, district manager, in California, for Raymond Pulverizer Division of Combustion Engineering Co., Inc., but many changes and simplifications have been effected since the original installation.

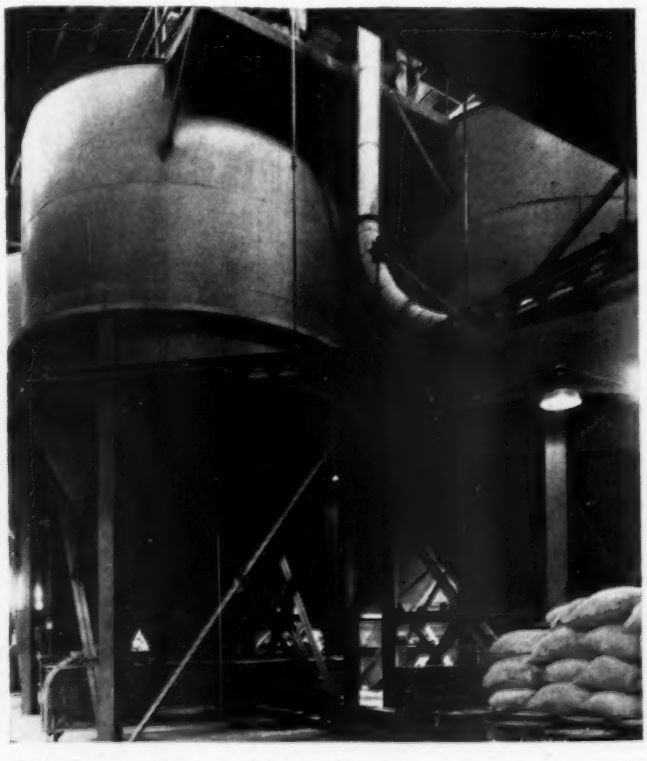
These simplifications came about when it was realized that the fine particles emitted from the kettle stack were not dust but small particles of wet mud. Thus the dust collection became simply a matter of impounding this fine mud. The gases from the kettle stack are passed through a 6-in. high speed suction fan blown into a small dust collector about 6-ft. in diameter. A water spray impinges against the blades of the fan and a second spray works inside the collector. Although the spray keeps the blades of the fan clean, it causes wear. The faces of the fan blades are therefore built up with hard surfacing alloys, and the assembly is so designed that a quick replacement of the fan blades can be affected. This dust control system has been in use about 20 years with no complaints due to dust. The whole assembly can be built at most any welding shop for a very nominal sum.

New Board Plant

Of steel and reinforced concrete construction, the board plant was designed cooperatively by engineers of J. B. Ehrsam & Sons Mfg. Co., and the Henry J. Kaiser Co. It was built by the latter company. The board plant which is in a new building is operated as a separate department. To accommodate the board machine, the building is 511 ft. long.

There are 3 large steel bins with conical bottoms that store the stucco as it is conveyed from the mill. Each bin has a separate Syntron feeder

Coming down and under the forming rolls are the three strips of paper that will make the top of the plaster board



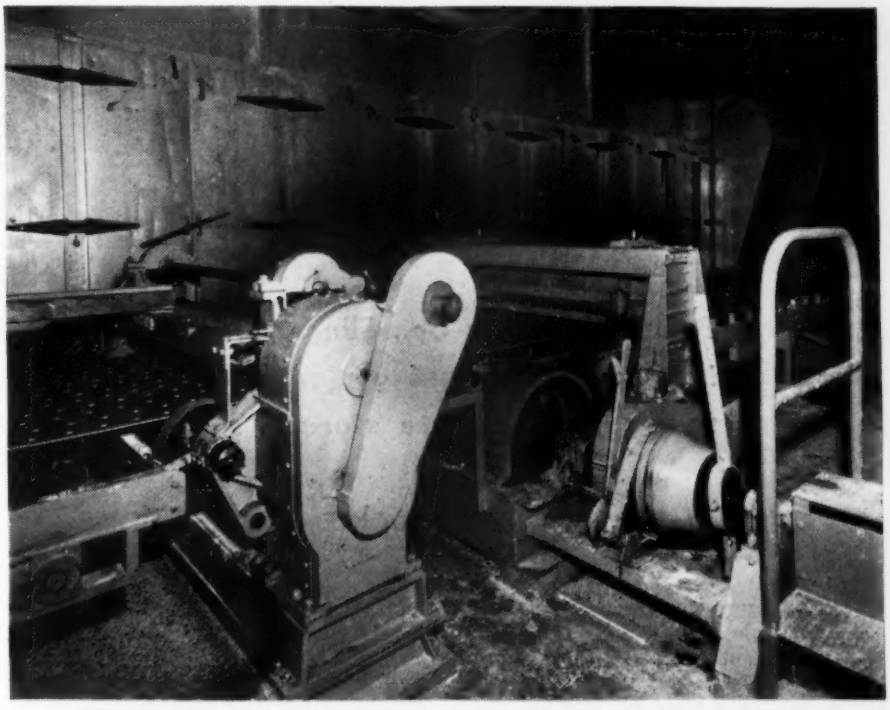
Steel silos over the wet mixing section of the wallboard plant are for storage of stucco and wood fiber

which feeds the proper amount of stucco into a mixing screw conveyor. Along this conveyor are other small Syntron feeders that feed in the proper amount of other materials to control the set and give the board the proper strength and working qualities. All this is thoroughly mixed as it is being conveyed to the Ehrsam continuous wet mixer, where the proper amount of water is added.

A roll (or rolls) of specially prepared paper is mounted on a shaft just back of the mixer, and the sheet of paper is drawn under the mixer. As the paper moves along it catches the mix and is pulled between two large forming rolls where the top paper is added and the edges are sealed so that when the material leaves the forming rolls, it is a completely formed board. When plaster lath is made, three narrower rolls of paper are substituted for the single- conventional 4-ft. width used for wallboard so that three strips of plaster board are made simultaneously. The green board is then carried on a long rubber belt so the core of the board has time to set properly. This production line of board runs the entire length of the building at the end of which the boards are cut into the proper lengths by an Ehrsam cutter.

Immediately ahead of the cutter is the Ehrsam punch used to punch holes in the plaster board. The cutter and the punch both operate automatically and function while the board is in motion. The long forming belt is driven through a Reeves drive unit with General Electric motors.

After the "green" boards have passed the cutter, the carrier rolls deliver the product to a set of cross-carriers which in turn feed the "elevator" to the Coe drier. This elevator is essentially a conveyor system hinged at the lower end and through electronic devices is raised and lowered so that the wallboard can pass into any of the eight shelves of live rolls that carry the board slowly through the drier. All this movement of the board is automatic and continuous.



In the foreground is the cutter and at the right is the punch for making plaster board

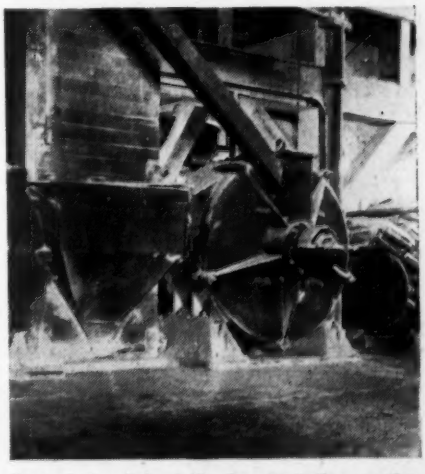
The Coe drier kiln is double width and eight decks high so the board travels only 1/16th as fast in the kiln as it does on the forming line. Steam coils heat the kiln, the heat being distributed by large circulating fans.

At the discharge end of the kiln men remove the boards by hand where they are inspected for quality and are put into bundles and made ready for shipment.

A large floor space has been provided on the south side of the Coe drier for the storage of finished wall and plaster board. Two Elwell-Parker fork trucks handle the finished product in this store room.

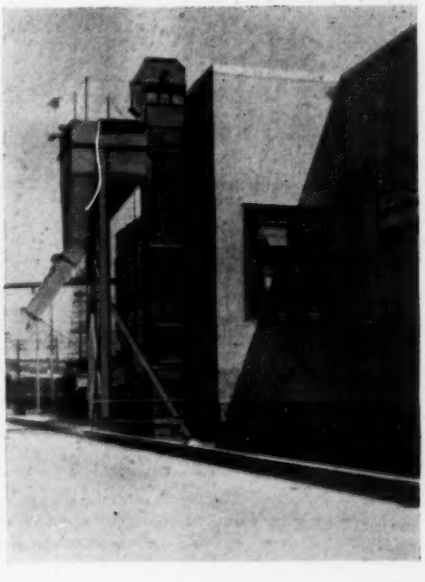
Above, and at the westerly end of the wallboard plant, storage space has been provided for the rolls of paper, adhesives and other materials used in making the wallboard. Rolls of paper are elevated to this floor and handled by a mono-rail.

New offices for the Southern California Division have been established at 3667 Atlantic avenue, Long Beach, California. Official personnel includes: Carl R. Olson, general manager, and Claude E. Harper, assistant general manager, with headquarters in Oakland; Gil F. Richards, general sales manager; Jerry Donoghue, Southern California Division Sales Manager; Dick James, Northern California Sales Representative, all with headquarters in Long Beach. E. H. Schaper is chief engineer; John Pooler, general superintendent. Wallace Riddell is chemical engineer and consultant, Arthur H. Darling, chemist.



One of the buhr mills for regrinding casting plaster

Rod mill for regrinding hardwall plaster



Right: "Buttons" or rejects from perforation of the plaster board are elevated to a bin where trucks make a final disposal of the product

Reducing Large Boulders to Aggregate

Palmer Crushing Co., Slinger, Wis., installs final screening plant above four large concrete storage silos

By DAVID MOCINE

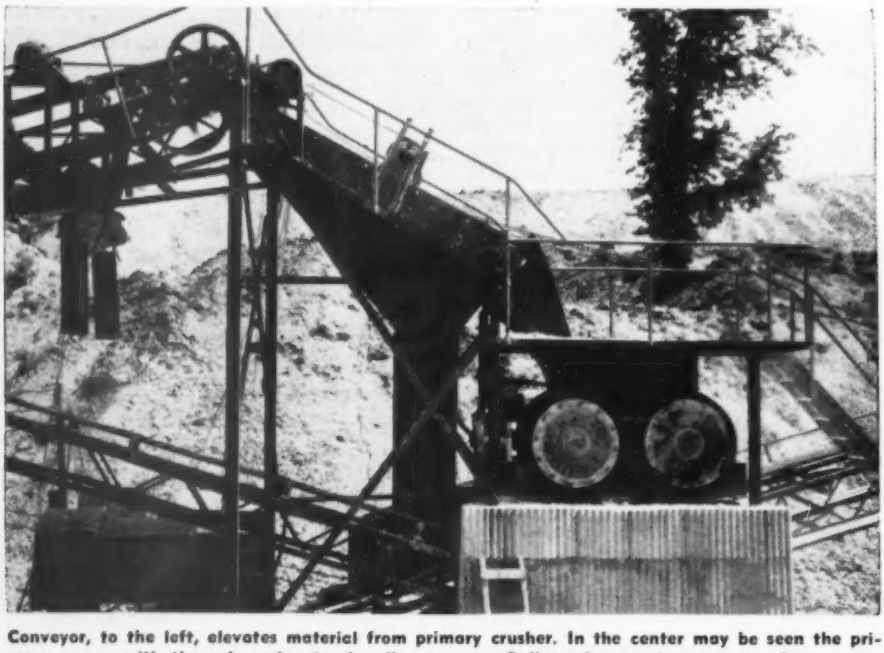
A NEW CRUSHING PLANT was recently completed by Palmer Crushing Co., at Slinger, Wis., in the central part of the state, using four reinforced concrete silos of 150 ton capacity each for finished product storage. These "engineered and built on the job" silos have the added flexibility provided by loading spouts on both sides so that they can be discharged into either railroad cars or trucks, or both simultaneously. Two railroad cars may also be loaded at the same time from different silos.

Cars are spotted for loading by a stationary winch, and after loading roll down a 1500-ft. siding by gravity to await railroad pickup. The car-spotting winch, powered by a 15 hp. Northwestern induction motor, may be operated by remote control so that the operator on the silo platform at spout level may move the car ahead without his leaving the silo when the car is filled.

The silos with 6-in. walls, were built with slip forms and ¾-in. round reinforcing steel. They rest on a 12-in. slab of reinforced concrete, and have false bottoms 15 ft. above the ground that provide ample height for gravity loading through the spouts. Each silo is 14-ft. in dia. by 45-ft. in height. Regular portland cement was used for this construction, and the finished job painted with Aquella. The cost of constructing the entire plant, including storage silos, has been set at approximately $100,000. Four grades of aggregate are normally produced in the closed circuit crushing plant and sizes may be varied by changing screens.

There are several interesting features in the material flow at this plant, the first being the use of a swing conveyor (see illustration) and surge hopper which is moved to follow the quarry face and is loaded directly from the shovel, thus doing away with the need for trucks or cars at this point. This system is more widely used in the far West. At present, a ¾-cu. yd. Northwest shovel is used to load the hopper over the movable 30-in. conveyor, approximately 60-ft. center to center. As the quarry face recedes, the conveyor will of course be lengthened, and a 1½-cu. yd. shovel is on order. When the new shovel is obtained, it is planned to convert the Northwest into a crane.

Close up of concrete storage silo



Conveyor, to the left, elevates material from primary crusher. In the center may be seen the primary screen with throughs going to the silo conveyor. Roll crusher receives oversize from screen and discharges to truck hopper conveyor, lower left

Crushing and Screening

The material from the quarry is elevated by the first conveyor to a 300-t.p.m. Telsmith No. 13B gyratory crusher with the bottom opening set for 2-in. The material is discharged from the crusher over the lower end of a 30-in. conveyor on 70 ft. centers, which elevates it 20 ft. to a 4- x 10-ft. vibrating screen, 1½-in. mesh, of the plant's own construction. Oversize from this screen falls to a double-roll crusher that is set for ¾-in. discharge.

This crusher is another point of great interest in the plant, being of P. W. Palmer's own design and patent. Described in an earlier issue of ROCK PRODUCTS, this roll crusher (see illustration) differs mainly in that instead of smooth or corrugated rolls meeting at a tangent, these rolls have 2- x 4-in. strips the length of the roll that are set at an angle to the roll's face, and thus the rolls present two flat surfaces to the material being ground. The circumferential streaks or grooves that are apt to appear on a conventional roll are entirely lacking here, showing that the material is immediately crushed upon impact rather than riding on top of the point of contact.

From the roll crusher the material

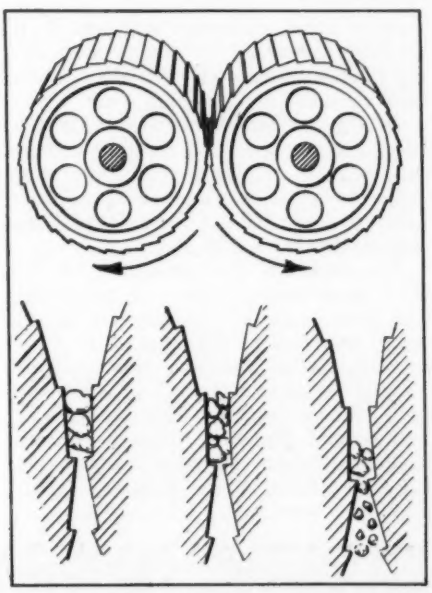
To the left, shovel loading hopper over swing-conveyor; center, primary crusher with conveyor belt inclining up to secondary screening and crushing station; and to the right, conveyor inclining up to top of concrete silos. Truck hopper for chips may be seen in front of the primary crusher with conveyor belt going to roll crusher. Wash water line may be seen above going to silo head screening plant

is discharged onto a 30-in. conveyor on 70-ft. centers operating in the opposite direction and along side the former conveyor. The material from the secondary crusher is elevated 25 ft. to a ⅜-in. screen over a truck hopper. The throughs fall into the hopper as limestone chips, sold locally for truck delivery, and used principally for driveway surfacing.

These chips from the roll crusher have the advantage over other crushed stone in driveways of not rolling and scattering so readily, and the supply of limestone chips at the Palmer Crushing Co. is not sufficient to meet the local demand. Another advantage in scalping off these fines after the secondary crusher is that limestone fines or dust do not continue through the rest of the flow to clog up screens and belts, get lost in the wash water, or be left adhering to the finished material.

Oversize from this ⅜-in. secondary screen returns to the primary crusher in a closed circuit. The throughs from the primary screen are discharged directly to a 30-in. conveyor, on 200 ft. centers, traveling at approximately 300 ft. per min. that elevates the material 58 ft. to a wash box at the top of the silos.

The wash box, 3- x 4- x 3-ft. deep, has two 3-in. streams of water entering on the opposite end from the crusher material. The discharge from the washer box is by two gravity spouts on opposite ends over two 3-deck 4- x 10-ft. vibratory screens of the company's own manufacture,



Details of roll crusher, designed and patented by P. W. Palmer, showing above, two rolls with tangential faces; and below, showing how flat faces are presented to material being crushed

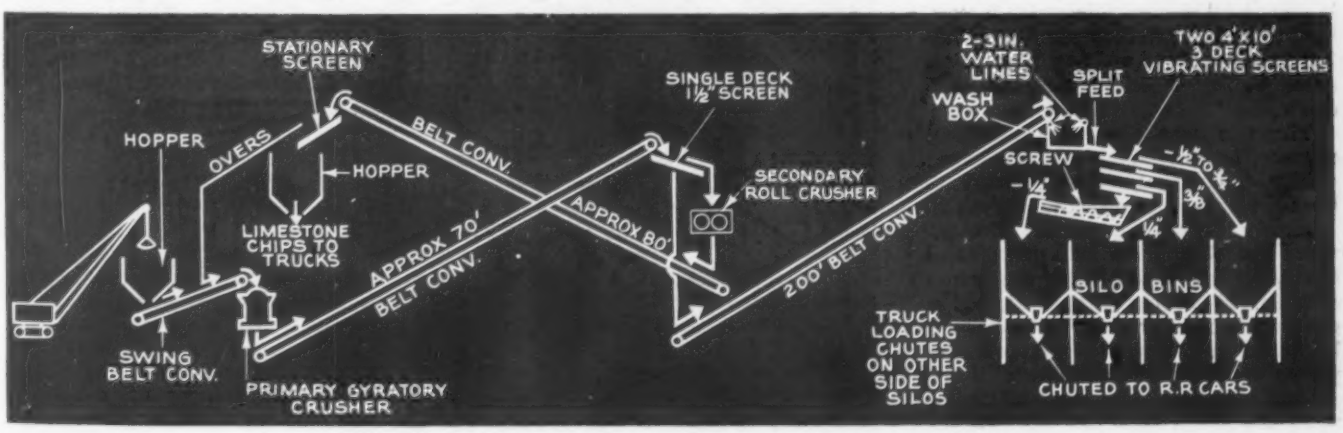
running in parallel, where additional wash water is sprayed over the material by three banks of five nozzles each on both screens. These screens throw counter to material flow.

The first screen is ¾ in. mesh and oversize is chuted directly into the south silo as minus 1½-in. plus ¾-in. finished crushed stone. Oversize from the second deck of the screen, minus ¾-in. plus ⅜-in. material, drops directly to the second silo. Oversize from the third or bottom deck, minus ⅜-in. plus ¼-in., is chuted to the third silo as pea gravel, while throughs from the third deck go to a Telsmith sand drag, where it is dewatered by twin 20-in. x 18-ft. screws before falling to the fourth silo.

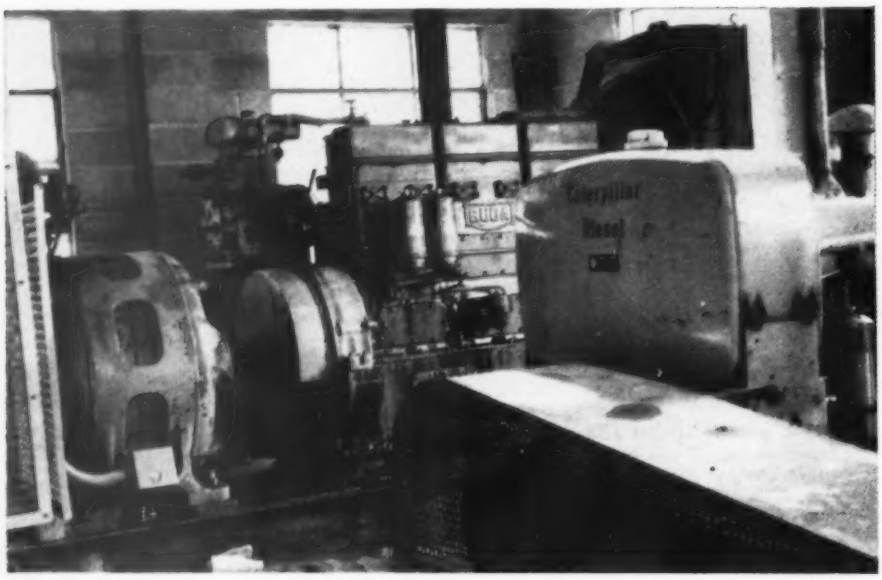
Water for washing is pumped from a 10-ft. sump 1100 ft. from the plant by a Carver pump, with 6-in. suction and 5-in. discharge, which delivers 1000 g.p.m. to the plant at 40-lb. pressure. The pump is run by a 75-hp. Prater Pulverizer Co. electric motor. The wash water is piped off to a sump, but a settling basin is planned for recovery of fines at an early date.

Diesel-Electric Power

Located under one roof in a large building of concrete block construction are the power plants and plant shop. The shop end of the building has a door at one end 12- x 13-ft. that is large enough to accommodate the shovel for repair or storage.



Details of unusual crushing plant operation and concrete silo storage facilities



Diesel-electric power plant interior

All electricity for operation of the plant is generated by two Diesel powered generators. A 200 hp. Buda and a 120 hp. Caterpillar turn Crocker-Wheeler and Electric Machinery Manufacturing generators, respectively. These two generators produce electricity for almost 300 hp. that are represented by the motors in the plant.

The Buda-powered generator produces electricity for the primary Telsmith crusher and the secondary special roll crusher (50-hp. each), all conveyors (main at 25-hp. and three smaller at 10-hp. each), and the ⅜-in. vibratory screen on top of the truck hopper for limestone chips (3-hp.). The Caterpillar-powered generator produces electricity for the Carver pump (75-hp.), sand drag (10-hp.), and the two parallel 3-deck screens on top of the silos (3-hp. each) and the car spotter.

Terminal Moraine Deposit Has Large Boulders

This new quarry is located on a typical Wisconsin terminal moraine with 6- to 12-in. overburden and an approximate gravel depth of 95 ft. in a 75-acre tract. Stone at this quarry is almost all minus 18-in., with a maximum of four boulders per day equaling this size. Sand passing ¼-in. mesh accounts for about 35 per cent of a day's run.

The site was chosen for several reasons, one of which was its availability to market (the property is bounded by rail on one side and U. S. Highway 41 on the other). Freight rates are reasonable both north and south, with two rail lines easily accessible. It is anticipated that the greatest outlet for the new plant will be the many ready mixed concrete plants in the Milwaukee area.

Good truck delivery demand (company trucks, private and for-hire vehicles) is expected in this predominantly large farming district. Still another factor is the strong possibility that Highway 41 will soon be rebuilt as a divided lane highway.

At the present time Palmer Crushing Co. is engaged only in stone crushing, but it is planned to enter the concrete block or some allied field in order to keep the staff employed during the winter months.

Although the Palmer Crushing Co. is a new corporation, the principal and owner, P. W. Palmer, is an old hand in Wisconsin's aggregate production. He is president of Hartland-Verona Sand and Gravel Co., Browntown Silica Co. and Hartland Sand and Gravel Co. Bob Palmer, brother of P. W. Palmer, is superintendent at the new plant, which employs seven men.

Illinois Rock Products Industry Review

A BULLETIN has recently been issued by the State Geologic Survey of Illinois summarizing the state's mineral industry in 1945. The section titled rock and rock products accounts for 40 of the total of 116 pages, and is complete with graphs and charts showing value and production for the 25-yr. period from 1920 to 1945.

During this period the highest production of limestone, dolomite and marl was recorded in 1942, with 14,000,000 short tons produced, valued at $13,000,000. Highest "average value per ton" was listed in 1920, with the per ton value falling below a 20-yr. average for ten years, 1927 to 1937. Total number of both commercial and non-commercial plants and their tonnages are listed for the years 1943 through 1945, together with total and average value received for the product.

Production and use of agricultural limestone is discussed extensively, county by county and also the amount of prepared limestone shipped to adjacent states for agricultural purposes. Cement, lime, mineral wool, clay and silica refractories, sand and gravel and fluorspar are all treated in this Report of Investigations, No. 121, State Geological Survey, Urbana, Illinois.

Erratum

SOUTH DAKOTA CEMENT PLANT advises that the news note appearing in the May issue was in error. Rather than considering the building of a second plant as previously reported, the present plant is undergoing an improvement program that already has involved several important changes.

Above, three of four silos (sand, extreme right) with wash water line at the top, waste water line at the bottom and sand drag to the lower right

LABOR RELATIONS TRENDS

Labor Attempts to By-Pass Provisions of L.-M.R.A. of 1947

By NATHAN C. ROCKWOOD

THE CONTRACT recently signed with John L. Lewis' United Mine Workers by the United States Steel Corporation and the near strike at the Ford Motor Co. plants have emphasized the most spectacular aftermath of the passage of the Labor-Management Relations Act of 1947. The two features of the Act which reportedly aroused the greatest ire in union labor leader circles were: (1) The liability of unions to be sued for breach of contract; (2) The making of affidavits that union officers were not secretly communists. The objections to the ban on closed-shop contracts haven't yet caused any great furor, probably because the unions expect to get around this one through maintenance of membership contracts, which are still permissible under certain restrictions.

One can readily understand why most unions' officers object to assuming liability for wild-cat strikes, because the truth is that discipline in some of these unions is very weak, and in the final analysis the union officers have little or no actual authority and small influence in controlling the acts of their most willful members. That they should object so strenuously to filing affidavits that they are not communists or communist sympathizers is not so clear. However, their opposition to these and other parts of the new law has led to open defiance of the Act, and various legal maneuvers to circumvent the law wherever possible.

Coal Miners' Contract

The coal miners' new contract omits a no-strike clause which John L. Lewis had permitted in previous contracts, and, theoretically, according to the contract, miners may work only as they are "willing and able to." In a coal miner's contract this is not particularly significant because John L. Lewis has been able to exercise iron discipline in his union, and he has a record of living up to his contracts with mine operators. However, officials of the N.L.R.B. have since informally pointed out that this clause, and any similar ones that union contracts with other employers may contain, will not give unions immunity under the law because the right to sue a union also rests with an injured third party. Thus a public utility, a railway or even a manufacturing concern which suffered losses because of an illegal strike of coal miners, could sue the United Mine Workers for a sum equal to such loss or damage. Moreover, it is still subject for court decisions as to whether or not a private contract between union and management can be in the public interest when it supersedes the law of the land.

The questionable clause in the coal miners' contract is as follows: "The contracting parties agree that as a part of the consideration of this contract, any and all disputes, stoppages, suspensions of work and any and all claims, demands or actions growing therefrom or involved therein, shall be by the contracting parties settled and determined exclusively by the machinery provided in the 'Settlement of Local and District Disputes' section of this agreement; or if national in character, by the full use of free collective bargaining as heretofore known and practiced in the industry." In brief the mode of settlement provided for is by arbitration.

Union Lawyers Give Advice

Lee Pressman, general counsel of the C.I.O., has advised the affiliated unions to include this clause in all future contracts: "It is understood and agreed that, in the event of any strike, work stoppage, or interruption or impeding of work on the part of any employes during the life of this agreement, there shall be no liability on the part of the international union, the local union, or any of their officers, agents or members. The sole recourse and exclusive remedy for the employer in such event is to impose disciplinary measures upon the employes involved in accordance with the provisions of this agreement."

Joseph A. Padway, chief counsel for the A.F. of L., has advised unions: "Even in the absence of a no-strike clause, some courts might hold that a collective bargaining agreement contained an implied agreement not to strike. Therefore, wherever possible, there should be inserted a clause to the effect that nothing in the agreement shall be deemed to prohibit or prevent a strike or other concerted cessation of employment by the employes covered by this agreement."

His advice continues: "An alternative suggested clause, if the foregoing is not acceptable, is one providing that nothing in the agreement shall prevent any employe covered thereby from leaving his employment either singly or jointly with other employes."

* * *

"If in any particular case it is found impossible to do away with a previously existing no-strike clause, then unions who do agree to a no-strike clause should be sure to limit the union's responsibility to strikes which it has actually caused or actually ratified. It should be specifically stated that, unless a union has actually authorized or actually ratified the strike, it is not responsible for any damages resulting from such strike. A concession in this case which it might be well to give, if a clause similar to the foregoing can be agreed upon, would be one to the effect that the union will undertake to take every reasonable means to induce any employes going out on strike to return to their jobs.

"An alternative suggestion in line with the above is the inclusion of a clause specifying that the union, in making the agreement, is acting merely as agent for the employes covered by the agreement and shall, under no circumstances, be liable for any strike, breach, or other default under the agreement, unless it can be shown that the union caused or instigated such strikes or other breach."

Mr. Padway's suggestions go further and say that a limit on liquidated damages should be set up in the contract, whether or not it contains a no-strike clause. He would have this amount stated as say $50 for a small concern and not over $500 in any case.

Ford Motor Co. Settlement

The chief points in the controversy over a new contract between the United Automobile Workers Union (C.I.O.) and the Ford Motor Co. mainly involved the issues described. The agreement follows in general that in the coal mining industry, providing that disputes over alleged breach of contract are to be settled as a last resort by an umpire selected jointly by an arbitration committee of two management and two labor representatives. The clause asked by the C.I.O.'s legal talent is as follows: "The union, its officers and members, shall not be liable for breach of contract because of any strike or work stoppage which may occur during the period of these deliberations and negotiations (i.e., while the committee is trying to reach a settlement; limited to not over one year). The company will not institute any suit against the union, its officers and members in such event. The company shall be able to avail itself of all other remedies in the contract in the case of strikes or work stoppages. * * * If the committee is unable to find a solution after a year of deliberations and negotiations, the union will retain the right to strike on this issue. In the event such a strike should occur, all other provisions of the contract will remain in full force for the entire term of the contract."

Significance of Union Attitude

Jesse Freidin, former general counsel and member of the War Labor Board, in a letter to the *New York Times*, has explained the attitude of union labor in part as follows: "The great strength of many labor organizations lies in their ability to point

(Continued on page 100)

Ten storage piles are separated by concrete walls which will serve as supports for the screening, washing and sand settling equipment overhead

SAND DRAGS Save Fines

Superior Sand and Gravel Co., Phoenix, Ariz., has large live storage capacity and extensive crushing and screening facilities

By W. B. LENHART

FOR MANY YEARS the Fisher Contracting Company operated the well-known Ward sand and gravel plant at Oxford, Mich. It was not surprising, therefore, that when this company decided to build a plant at Phoenix, Ariz., a very modern structure was built embodying many interesting and novel features.

Four Drags for Sand Recovery

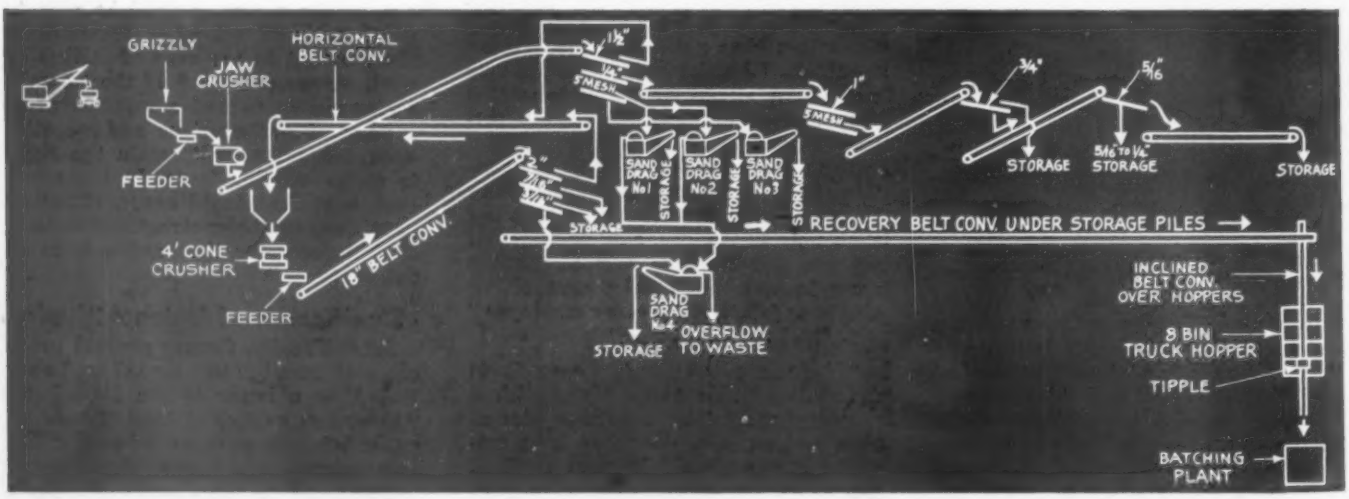
With increased demands for sand from concrete block manufacturers, there is a shortage in the area. To recover every possible ounce of sand, exceptional methods have been employed. This can be well understood if it is borne in mind that the gravel from the Salt River bottom at Phoenix is very hard material. At the old Ward plant near Detroit, Mich., the Fisher Contracting Company found it could process around 500,000 tons before equaling the mantel and liner wear in processing 30,000 tons of the Salt River gravel.

When faced with the necessity of recovering sand, the job was done in an unusually thorough manner. The Superior Sand and Gravel Co. uses four sand drags that were designed by Del W. Fisher, president of the company. Each of the drags are almost identical in general design although the fourth sand drag, called the crushed stone drag, probably has a larger settling area than the others. This last drag, as can be seen in the illustration, has a large tail wheel (about 10 ft. in diameter) so that the bearings can be above the water line. The tail wheel is in a settling pool about 8- x 12-ft. The 24-in. belt has 3- x 4-in. angle iron drags spaced on 8-in. centers. The belt moves at 2 r.p.m. The four sand drags prepare two concrete sands of practically identical grade; a plaster sand and a washed crushed stone sand. The latter product is said to be welcomed by the concrete block manufacturer and, as shown by a study of the flowsheet, it contains, besides the crushed stone, some of the finer uncrushed sizes that overflowed from the other three drags.

The plant has been in operation about one year. It was designed and built by the company, but the Allison Steel Manufacturing Co. of Phoenix did most of the steel fabrication.

Sand and gravel plants along the Salt River bottom used to have their supply replenished by the seasonal floods but since irrigation projects and attendant dams control such floods, operators have lost that advantage but there is a plentiful supply at greater depth, and the deeper sources yield coarser materials which require crushing. However, there is good gravel and sand above the 125-ft. horizons.

At the time of inspection all ship-



Flowsheet of crushing, screening, and sand recovery operations. Four sand drags provide for maximum efficiency in retrieving sand

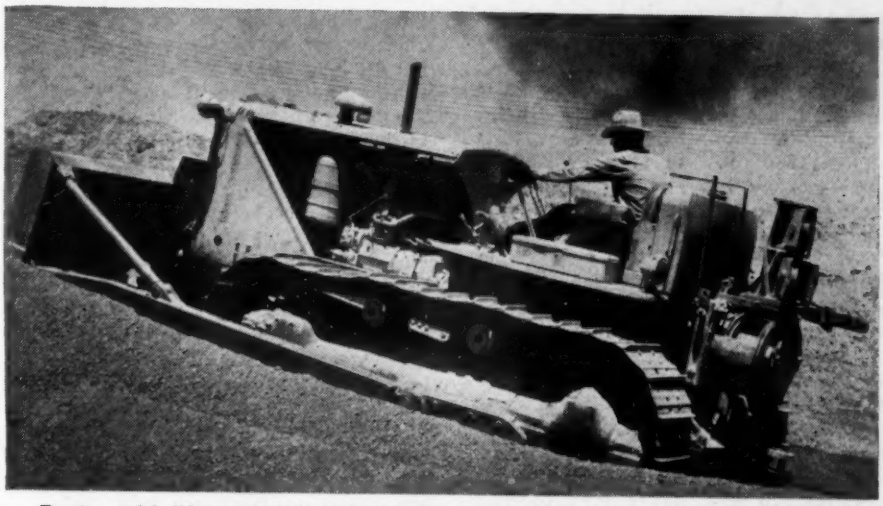
ments were going out by trucks or through the company's ready mixed concrete plant, but standard track siding is being extended into the plant so that rail shipments will soon be possible. This is one of the few plants in the area shipping by rail.

Large Live Storage Capacity

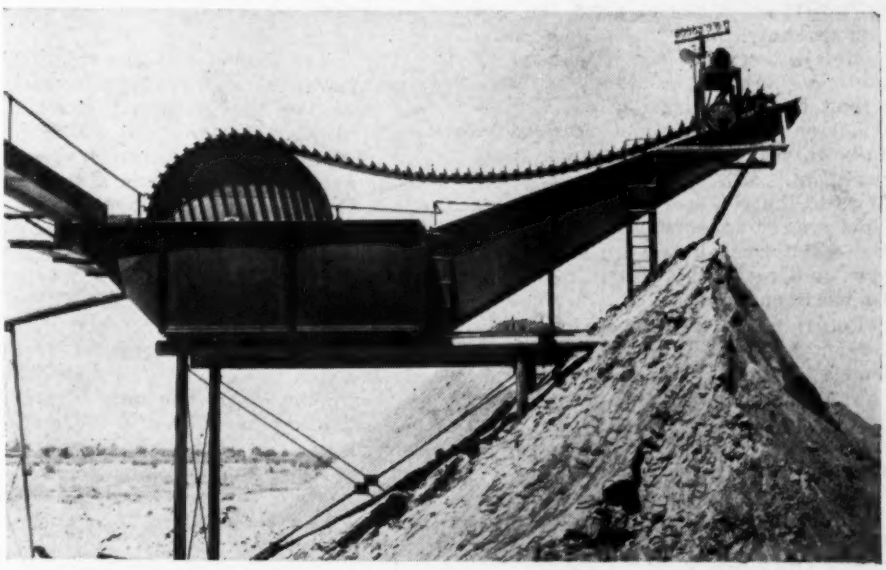
Ten storage piles, each separated from the other by a concrete wall, are located in a single line with the separating concrete walls acting as the supports for the screening, washing, and sand settling equipment mounted overhead. Under this stockpile is a concrete tunnel with reclaiming belt fed by 10 Jeffrey electric vibrating feeders. This long reclaiming belt discharges to a cross inclined belt that serves two nests of truck loading bins as well as the Johnson weigh batchers for the ready mixed concrete section. There are eight aggregate bins for truck loading with four sizes of stone used for ready mixed concrete, but two of these sizes are blended on the reclaiming belt. On top of the nest of bins is a Continental Gin Co. tripper for distributing the various sizes of sand and gravel to the various bins. This is an important department, for if any stoppage happens here the ready mixed concrete plant would soon be forced to shut down and truck shipments would be curtailed, so an attendant is kept at this point during operation of the plant. However, should a stoppage occur here, or if otherwise more convenient, the company has a Hough lift dumper "Payloader" mounted on rubber, a Heiss Pathdigging loader, and a Model T-4 Trackson scoop lift mounted on crawler treads—all for emergency reclaiming of sand and gravel from the ground storage piles. When the stockpiles are low in any size (sand is short most of the time), a Caterpillar D-8 and dozer is used to push the sand over to the reclaiming belt tunnel.

Crushing and Screening

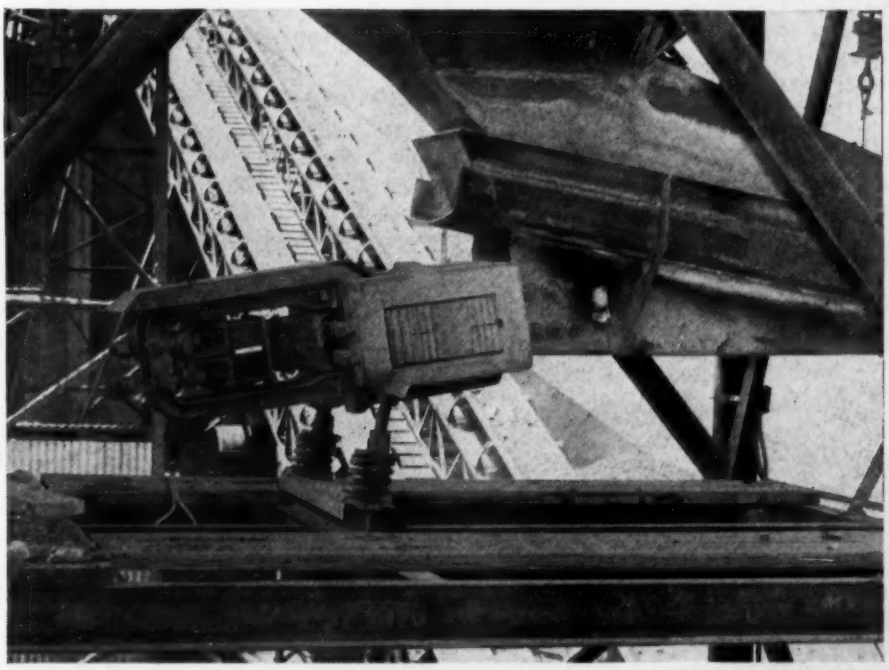
Loading in the pit is done with a 1¾-cu. yd. Northwest shovel that loads to one of three Koehring 10-ton capacity dumpters. These dump to a horizontal rail grizzly mounted over the hopper ahead of the 10- x 36-in. Cedarapids jaw crusher. The grizzly is made of 90-lb. rails, spaced on 8-in. centers. The rails in turn are supported by 16-in. I-beams on 5-ft. centers so the assembly is very rugged. The jaw crusher, fed by a Jeffrey electric vibrating feeder, discharges to a 24-in. inclined belt conveyor that delivers the material to the 4- x 12-ft., three-deck Symons vibrating screen that operates wet. The belt is driven by a Reliance motor through a Falk gear motor. The gravel gets its first washing here. All the conveyors in the plant were supplied by the Continental Gin Co., with American Rubber Co. belts. The top deck of the



Tractor and bulldozer which is used to push aggregates over to reclaiming tunnel conveyor



Sand drag with large tail wheel 10 ft. in diameter which keeps bearings above water level



Vibrating feeder that gives a controlled feed to the cone crusher. There are also several of these feeders in the tunnel under the stockpiles

scalper has 1½-in. wire, the middle deck ¼-in. and the lower (use only one-half a deck) has 5-mesh cloth. The oversize from the top deck falls through an 8-in. steel pipe to a long, horizontal, 18-in. belt conveyor that returns the oversize to a cylindrical steel storage bin ahead of the 4-ft. Symons cone secondary reduction crusher. Material in the storage bin is fed to the cone crusher by another Jeffrey electric vibrating feeder, this making a total of 12 of these feeders in the new plant. The Symons crusher discharges to an 18-in. inclined belt conveyor running parallel with the first mentioned 24-in. main conveyor belt. The 18-in. belt delivers to screen No. 5 which is a 4- x 8-ft., three-deck, Symons screen operating wet. Its top deck has 2-in. wire, the middle deck 7/16-in., and the lower deck 3/16-in. Material from the top deck is chuted back to the long, horizontal belt serving the bin ahead of the cone crusher, making a closed circuit for crushed material. The material on the second and third decks falls to its respective storage compartment. Minus 3/16-in. material flows to the No. 4 crushed sand drag. This drag is not mounted in line with the other three but is set off to one side, and reclaiming from it is done by mechanical loaders.

Returning to the scalper screen, the second deck of this screen is heavily loaded and still contains some sand so it falls to a horizontal belt serving screen No. 2. This is a 3- x 6-ft., two-deck Symons, operating wet. It has a 1-in. top deck and a 5-mesh lower deck. Here the material gets its second washing. The minus 1½-in., plus 1-in. falls to its storage compartment. Minus 1-in., plus 5-mesh (material on the second deck) passes to an inclined belt and is delivered to screen No. 3. This is a single-deck, 3- x 6-ft., Symons with ¾-in. screen cloth. It operates dry except for entrained water in the gravel. The minus 1-in., plus ¾-in. falls to its storage compartment with the undersize passing to another short inclined belt serving screen No. 4. This is a single-deck, 2- x 6-ft., Symons screen and operates dry, the minus 5/16-in. to ¼-in. (throughs) falling to the stockpile below with the plus sizes passing to a short, horizontal belt that delivers minus ¾-in., plus 5/16-in. to the end storage compartment. Returning again to the scalping screen, the throughs from the lower deck (5-mesh) pass to drag classifier No. 3 for the production of plaster sand. The throughs from the middle deck of the scalper along with possibly some retained fines is split into two equal portions, and each portion goes to either drag No. 1 or No. 2. Overflow from all three of these sand drags goes to drag No. 4 (the crushed stone drag) where the fines in this diluted pulp get a chance to settle and are recovered. Each of the sands from drags Nos. 1, 2 and 3 falls to its respective compartment over the reclaiming tunnel.

The plant has a capacity of 300 tons of washed and graded material per hour. An 8-in. deep-well Pomona pump supplies the water for washing.

A manually-controlled Johnson weigh batcher with a 4-arm scale for the aggregate and a single-arm scale for the cement is used in the ready mixed concrete plant. The batcher is a 5-cu. yd. unit, and water is measured by volume. A Master Builders Pozzolith dispenser accurately measures out that admixture. A large fleet of Jaeger and Smith transit mix trucks mounted on Diamond T and Autocar chassis delivers concrete. Controls include Cutler-Hammer motor controls; Bulldog Electric Co. "Clampmatic" safety switches with General Electric push-buttons.

Officers of the company include: Del W. Fisher, president; John F. Fisher, general manager; and E. O. Phlegar, sales manager. Elmer Clark is plant superintendent.

Shovel loading 10-ton haulage unit which transports material to plant

Phosphate Production

PLANTS for the reduction of phosphate rock that are under construction or have recently started production in central Tennessee are Owens Agricultural Phosphate Co. and Prairie State Phosphate Co., Centerville, and the River and Rail Phosphate Co. near Nashville.

Handbook on Building Stones of Central Texas

UNIVERSITY OF TEXAS, Austin, has recently issued a report on the building stones of central Texas that was delayed in its completion by the war. The publication is chiefly the work of V. E. Barnes, R. F. Dawson and G. A. Parkinson, all of the University staff.

The purpose of this work is to examine and report on the building stones of a portion of central Texas, an area in which there are more types and a greater abundance of building stones than anywhere else in the state, and possibly more than in any other equal area of the United States. The geologic zone covered by this report includes portions of only ten of the state's 254 counties, but was chosen for examination because of the great amount and variety of its stone, and because it is fast becoming a quarrying center in the state.

The rocks in this area are divisable into three groups; namely, pre-Cambrian, Paleozoic and Mesozoic. All three groups contain building stone of great economic importance. The book takes up each locality and type of stone, giving general and specific geologic history as well as availability and suggested uses. This book of 200 pages, complete with maps, charts and illustrations, may be had in either cloth or paper binding by communicating with the Bureau of Economic Geology, University of Texas, Austin 12, Texas.

Limestone Industrial Uses

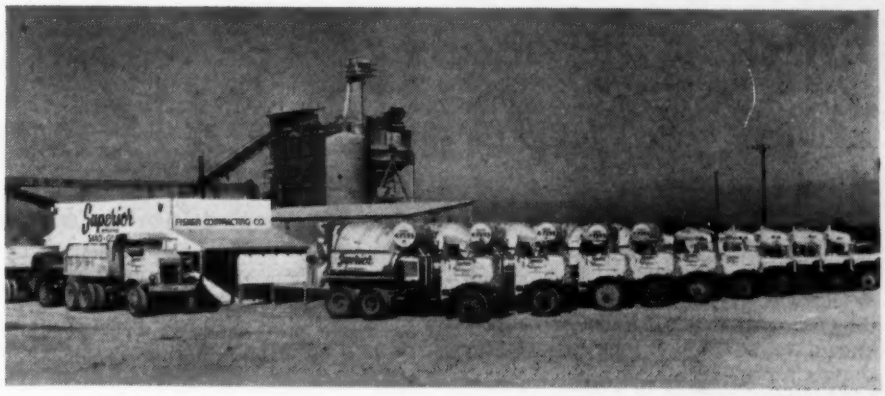
DURING 1945 the chemical and processing industries absorbed 49,800,000 tons of limestone, or approximately one-third of the total domestic production. Major users included metallurgical plants, producers of alkali and refractory lining, paper mills, glass manufacturers, coal mine dusting, sugar processors, water purification plants, manufacturers of insecticides, fungicides and disinfectants, and numerous others.

The greatest single consumer of lime and limestone during 1945, as in previous years, was the steel industry, which used it for fluxing agent in blast furnaces, open hearth and electric steel furnaces. Michigan produced the greatest amount of fluxing stone, followed by Pennsylvania, Ohio, West Virginia and Alabama, in that order. These highlights were abstracted from Information Circular 7402, "Industrial Uses of Limestone and Dolomite," which may be obtained from the Bureau of Mines, U. S. Department of Interior, Washington 25, D. C.

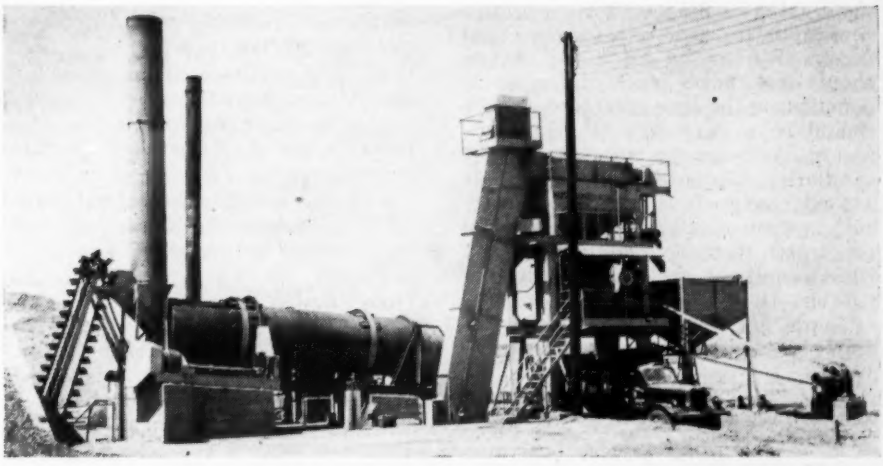
Tripper on top of bins over batching plant to divert aggregates on belt to various compartments

BATCHING
Concrete
and Hot Mixes

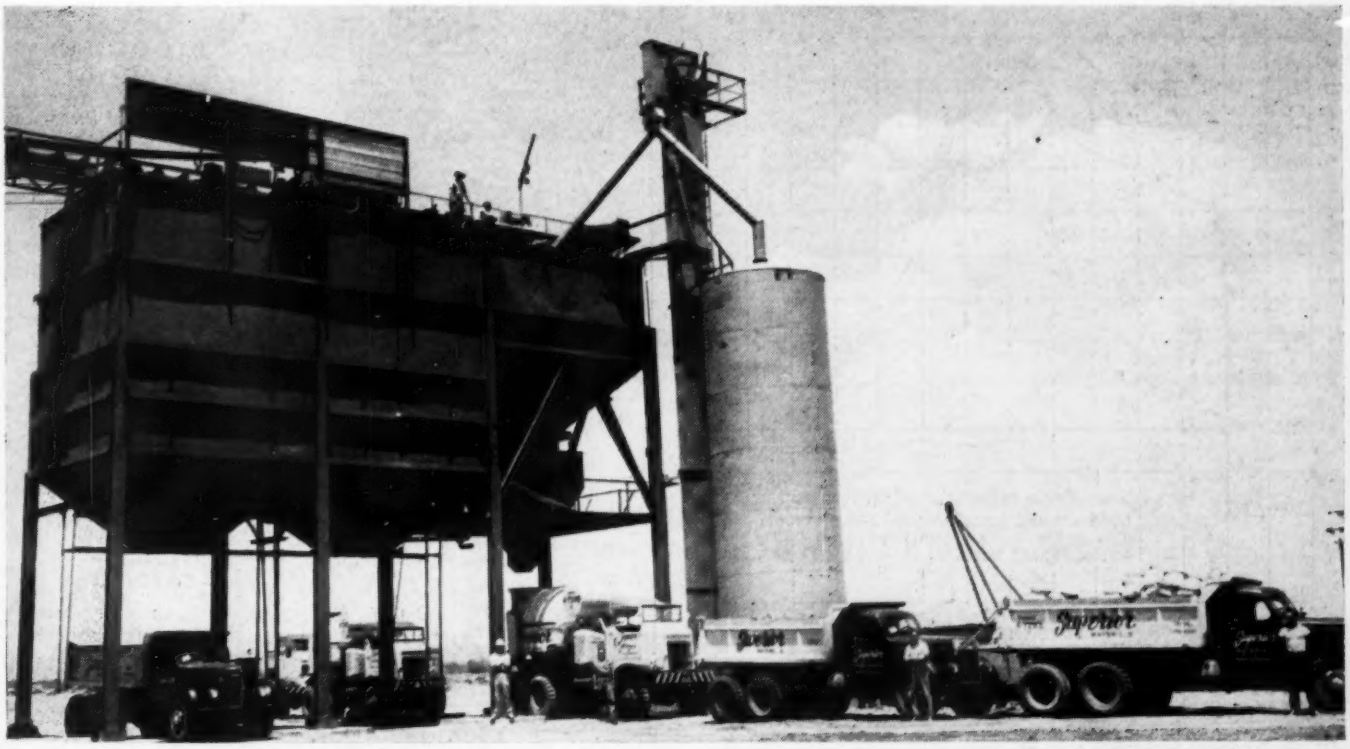
Superior Sand and Gravel Co.



Line up of ready mixed concrete trucks with batching plant in background and sand and gravel plant, to the left



Bituminous hot mix plant located adjacent to sand and gravel plant



Bins for ready mixed concrete batching plant and also for truck deliveries of aggregates from sand and gravel plant. Bulk cement silo to the right

Efficient Methods of Manufacturing Chemical Lime

Part 2: Reasons for Unavailability of Calcium Oxide

By VICTOR J. AZBE*

LABORATORY analytical procedures show a great discrepancy between the CaO available and actual free CaO known to be in the lime; field tests show an even greater disparity.

Any fundamental unit particles of CaO will readily change to hydrate if steam can find access to them. The fact that there is unavailable CaO and that reactivity is low, means merely that water or the respective reagent is for some reason prevented access. Water as such, or steam, should not have much difficulty in penetrating the lime structure as lime should be a very spongy mass with almost half empty space of great capillarity. While the individual voids are extremely minute, the water molecule is even smaller and can readily penetrate, even too readily at times, when conditions are exceptionally favorable.

There are several reasons, some center around recombination, the others mere mechanical obstruction, but this is on such a minute scale that one has to use the full extent of his powers of imagination to visualize it.

The CaO in the lime may be there in several guises as:

1. CaO, undissociated from CO_2; that is, core of the original stone and calcination resisting crystals, mainly surrounding the core.

2. CaO, available to the process in question; such as for example, causticizing, to distinguish from the processes in which it becomes available regardless.

3. CaO, unavailable, recarbonated by CO_2 back to $CaCO_3$ and as such disseminated through the mass.

4. CaO, unavailable, dissociated from CO_2 but later combined with the impurities of the lime or sulphur and arsenic of the coal to form calcium-silicate, aluminate, ferrate, sulphate or sulphide and arsenate.

5. CaO, unavailable, dissociated and free but occluded by shrinkage caused by overburning, or sealed off by recarbonated particles, or by calcium silicate and other slags.

The explanation for CaO in combinations with CO_2 as remaining core is self evident, of course. Lime around the core may still retain some carbonate as some calcite crystals do resist dissociation greatly, but not when CO_2 is found in the outer portions of a piece of lime; that is, in the portions which have received more than sufficient heat for complete dissociation.

Take, for example, two specimens of kiln lime, one fairly well burned, the other an under burned lump with small core in it. Each lump had about ½ in. chipped from the surface called "outside," and then next the ½ in. chipped from the "inside."

Results of analyses of these samples are shown in the table on the next page.

The outside at least should have no CO_2, as this outside must have been at a temperature far above that of

*From a paper presented before the recent National Lime Association convention at Hot Springs, Va.

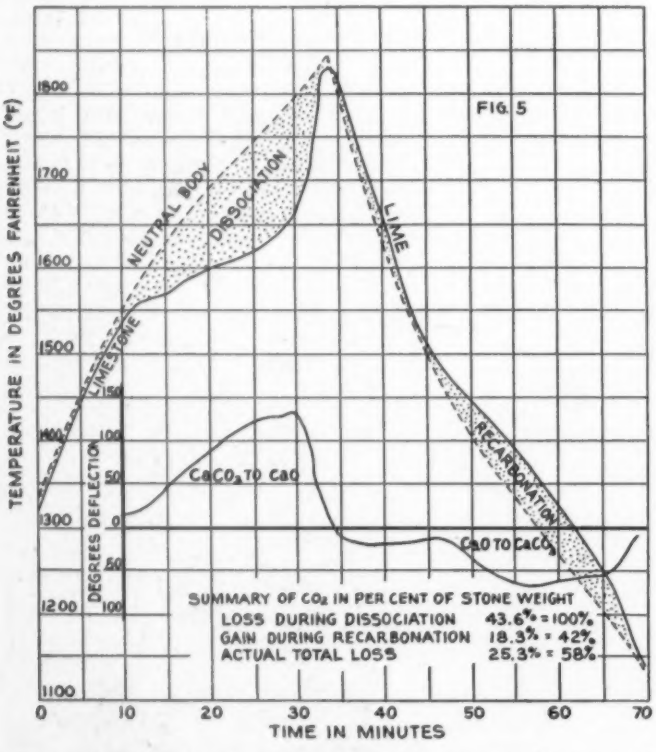


Fig. 5: Calcination and recarbonation of lime in a rapid stream of 32 per cent CO_2 atmosphere

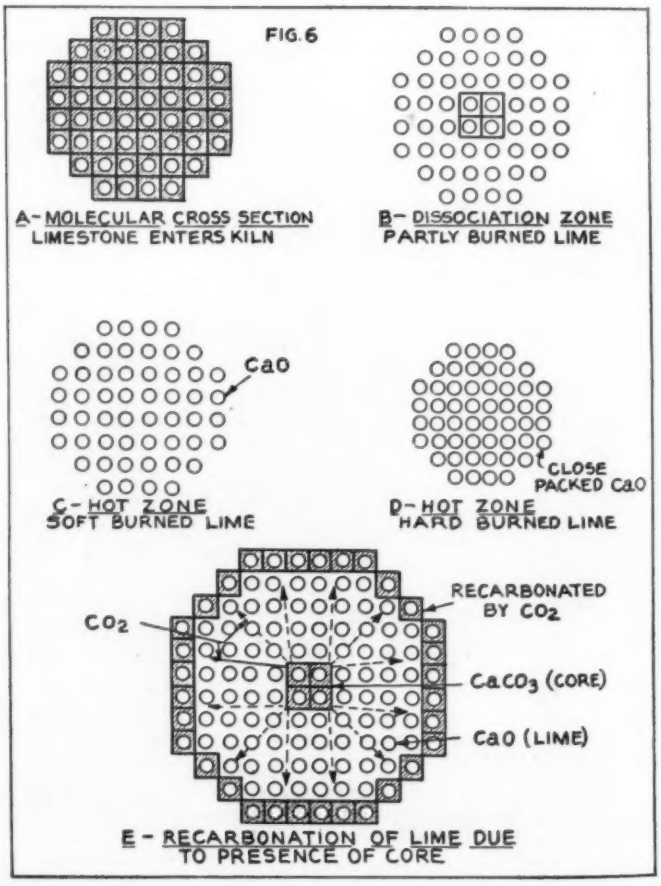


Fig. 6: Graphical presentation of isolation effect in calcining limestone for lime

equilibrium, and presence of CO_2 can only indicate re-absorption of CO_2.

Neither is the explanation so very readily available for the CaO which refuses to combine with water. In contrast to MgO, CaO will readily convert to hydrate if water can find access to it. That there is inactive CaO, means merely it is occluded, surrounded by something impervious to water.

The simplest reason is that lime is so hard burned that some portions become coarsely crystalline, of low surface area, instead of a crystalline state bordering on amorphous with a tremendous surface area available for reaction. However, good CaO lime seldom is that hard burned.

The other reason would be occlusion, isolation, and whenever this occurs there is a two-fold harm. It may be due to impurities which combined with CaO, thus negativing some of the CaO. The resulting low melting point substance may also have spread enveloping portions of the uncombined CaO. It is this second action which explains why availability has dropped off faster than the amount of impurity in possible combination would demand.

Blocking action may also take place through slight prehydration. For example, lime just drawn from the kiln may hydrate very fast, but on exposure to air it becomes deactivated. Atmospheric moisture entered into its pore system and hydrated it to a very slight extent, not enough to cause any disintegration, but enough to close off the pores, because in hydration there is mass expansion. Slight recarbonation of the hydrate may aid this and make it only more resistant to water when the real hydration is attempted. We do not think this harms the lime much but it can be both a nuisance and sometimes a blessing in disguise.

In respect to recarbonation, Fig. 5 shows how readily it can take place at the high temperatures immediately below the dissociation temperature; far more readily in fact than at any lower temperature. Giving CO_2 access, it is almost instantaneous, and conditions, to be explained, create a most ideally perfect penetration.

Lime dissociation is governed by CaO tension of the immediately adjacent atmosphere. The surface of limestone will begin to dissociate at fairly low temperatures, when the surrounding atmosphere is air. This same limestone exposed to the kiln atmosphere of around 30 per cent CO_2 dissociates at about 1540 deg. F. If the surrounding gas is all CO_2, such as a piece of lime would be internally when pressure is still atmospheric, the dissociation temperature is 1648 deg. F. When a large lump of lime is calcined, an immense volume of CO_2 is given off which has to force itself out through the minute, initially submicroscopic pores. Great internal pressures are therefore built up, which in turn raise the required dissociation temperature by several hundred degrees.

	Sample without Core		Sample with Core	
	Outside	Inside	Outside	Inside
CO_2	2.9	3.4	2.4	8.8
CaO	88.8	88.8	87.9	66.1

Of course external temperatures always have to be higher to cause heat to flow internally. The larger the stone the higher they need be, and then still higher, due to this built-up back pressure.

Through the increase of required external temperatures, the external surface may be overburned before the internal regions are fully calcined, which is more likely to occur in the case of dolomitic or impure limestone. This external overburning causes shrinkage and makes escape of CO_2 even more difficult.

Recarbonation

When a lump of lime still containing core passes from the hot zone into the cooler, the surface will cool quickly. However, its interior will remain hot for a relatively much longer time and calcination of the core will continue. CO_2 given off will start outwards but will be reabsorbed as soon as it reaches the regions where temperature and pressure are favorable. The larger the lump, the greater the rate of calcination, the internal pressure will be higher and both the external and internal temperatures will therefore be higher. The high external temperature will overburn the lime to a certain extent before the core is all gone. The high internal temperature will cause CO_2 to come off for a long time after the lime passes into the cooler, which will disseminate itself, causing recarbonation of some CaO and occlusion of other, and very seriously lower the available CaO.

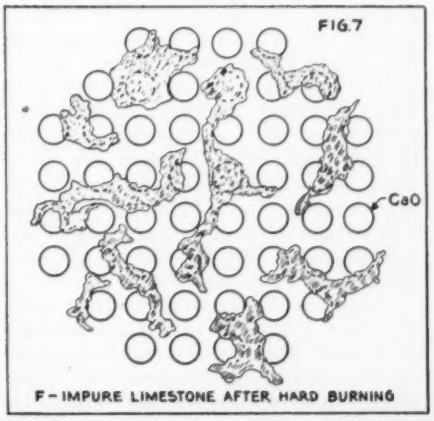


Fig. 7: Showing lime occlusions due to slag dissemination

It should also be remembered that while calcination requires a great deal of heat, recarbonation is an exothermic reaction giving off precisely the same amount of heat. That the heat is generated within the lump makes it even worse, it tends to prolong the hot state and so prolong dissociation of core and cause recarbonation of good lime. A cooler containing hot lime holding core is a lime kiln calcining zone in reverse.

In Fig. 6 and 7 an effort is made to illustrate simply the isolation effect brought about through recarbonation by solution through slags and occlusion of CaO. We shall follow the lime rock as it descends through the kiln.

Imagine that diagram *A* represents the molecular cross-section of a piece of lime rock. As it descends through the preheating zone, heat is absorbed but nothing happens to its physical structure; i.e., the unit cells retain their original arrangement. When, however, the stone enters the dissociation chamber, where the heat and temperature are sufficient to cause dissociation, it begins to assume the new configuration which crudely is represented by diagram *B*. The outer portion is lime, the inner portion is still stone-core.

As it passes through the hot zone the calcium carbonate portion becomes smaller and smaller until it is completely calcined. None remains and the product is known as "soft-burned," represented by diagram *C*.

Should the piece of lime remain in the hot zone too long or become too hot, it takes up a close packed configuration shown by diagram *D*. It now is known as "hard-burned" lime. This assumed structure explains why such lime is slow slaking and forms short putty as contrasted to a soft-burned lime represented by diagram *C*. For it can be seen that due to the decreased intermolecular spaces, water would have difficulty in penetrating to all the molecules.

Now, let us assume that a lump of lime enters the cooler before it is completely calcined and also let us assume that it cools slowly. The outside of the lump will cool faster than the inside which is still generating carbon dioxide. As soon as the outside layers drop below the dissociation temperature the CO_2 which is passing out of the center is reabsorbed by these layers and we have a special kind of recarbonation taking place, reversion back to stone. From the resulting combination of CaO and CO_2 heat is liberated, which in turn tends to prolong the process of internal calcination and external recarbonation. The outer pores become plugged and there results a lime of low availability because water molecules can not penetrate past a built up wall of calcium carbonate. This action is portrayed in diagram *E*.

Lime may be recarbonated in another manner; namely by absorption of CO_2 from kiln gases, but that is less likely to occur and when it does it is less likely to do much damage. Energetic recarbonation of CaO direct to $CaCO_3$ can only take place at high temperatures. That is in the region below dissociation temperature. At low temperatures recarbonation reaction is preceded by hydration.

In diagram *F* presented by Fig. 7, the effect of low melting slags is shown. They spread and dissolve into themselves lime particles and on solidification isolate still other lime portions.

Progressive Steps in Calcination

As this subject is important we here carry the matter of calcination and recarbonation still further. Fig. 8 presents the likely internal and external temperatures prevailing when these reactions take place. Three temperatures are given of the lime for each condition and one of the surrounding atmosphere.

Condition 1: This represents the heating of stone through temperature levels where no calcination can yet occur. It will be noted that gas temperature is slightly warmer than the surface of the stone because the surface is cooled by the heating of the internal contents of the lump. The temperature drops off progressively.

Condition 2: Here the beginning of the calcination occurs. The surface is warm enough to calcine in the surrounding atmosphere of low CO_2 content. At the surface, lime will form at 1525 deg. F. because the gases there have only a CO_2 content of 32 per cent. In a lower CO_2 concentration it would form at even lower temperature. However, this action does not extend far because temperatures internally are too low and within, the state of low CO_2 concentration does not prevail.

Condition 3: Here lime is really being made. But strangely at the point of calcination the temperature is much higher than the dissociation temperatures we hear of or read of in books.

Of course, so far below the surface of the lump the atmosphere will be all CO_2 gas. The rapid flow of gas outward will effectively prevent the entrance of any other gases inward. If the lump is very small or very porous, the inside calcination would proceed at a temperature of 1648 deg. F. as this is the dissociation temperature in 100 per cent CO_2 atmosphere at atmospheric pressures. However, the channels through which the CO_2 escapes are extremely minute and the volume of the hot CO_2 gas is very great, and therefore velocities are very high. So internal pressures at times are very great and corresponding dissociation temperature rises.

In this particular case we note that the lime at the point of calcination is

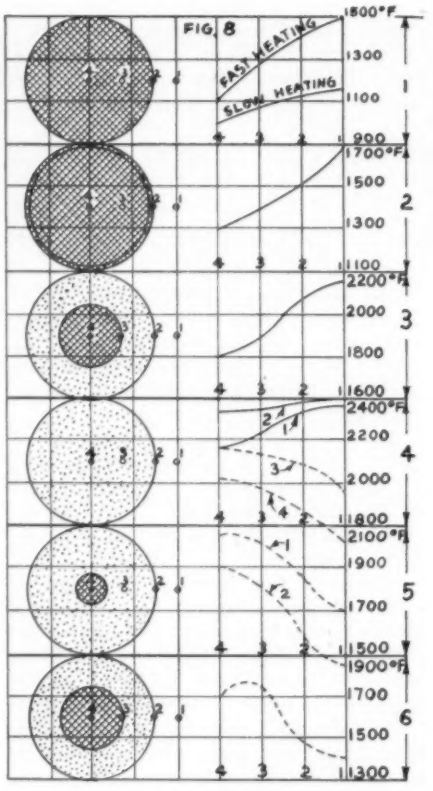


Fig. 8: Probable stages in the manufacture of lime in a vertical kiln: (1) preheating stone; (2) surface calcination; (3) internal calcination; (4) completion of calcination and incipient cooling without recarbonation; (5) cooling with slight recarbonation; (6) cooling with considerable recarbonation

1900 deg. F. This peculiarity demands a higher external temperature than would be necessary if CO_2 would escape freely, thus reducing capacity particularly with large lumps of lime. The carbonate in the center is at a temperature considerably higher than necessary to dissociate at atmospheric pressure, but it can not do so much until either pressure is lowered by lowering the rate of dissociation or temperature raised to bring it in equilibrium with the pressure.

Condition 4: This represents a completely burned lump of lime. Right at the end of calcination the temperature Curve 1 may prevail. If lime remains in the hot zone its state would be covered by Curve 2. If lime is completely burned and is removed without delay into the cooler, Curve 3 would apply, showing that most of the lime never reached the highest temperature. Curve 4 is the same lime after it has been in the cooler for some time. Thus, completely calcined, there are no complications and Curve 1 represents the most desirable state. This, however, can only prevail when there is no remaining core.

Condition 5: Represents lime with some core. If this lime is maintained at a high heat until core disappears nothing happens. However, if it is drawn into the cooler and starts to cool, then the surface temperature will drop to below dissociation level. The internal regions still will be hot as the rate of calcination drops; that is, the rate of outflow of gas, and the internal pressures will drop also. With reduction of dissociation pressure, dissociation temperature will drop and the core will continue to calcine. There will be no heat coming from the outside except the sensible heat of the core, and the heat of the lime surrounding the core will be drawn upon. The action will continue until the temperature drops to 1650 deg. F. and comes into equilibrium and to rest.

Even then though, if there is any influx of other gases further lowering CO_2 tension, the action to some small extent may continue until the 1525 deg. F. level is reached on the surface or 1650 deg. F. internally. Below these two points any CO_2 generated at the core will never reach the outside. Curve 1 shows the temperature still too high for recarbonation, but the outside tends to cool fast while the inside tends to stay hot and as soon as the condition represented by Curve 2 is reached, all CO_2 from the core will be quite effectively absorbed. In this absorption, heat will be generated, which in turn will tend to keep the lump self contained, so far as exchange of heat for dissociation and recarbonization is concerned.

The lump of lime coming out of the cooler may not show any core, but it is almost all disseminated throughout those zones where temperature and pressure conditions were favorable for the absorption of CO_2. It is usually conditions like this that prevent one from getting pure CaO lime without at least some CO_2.

Condition 6: Represents lime with a great deal of core. In this case there is not enough stored excess heat to completely dissociate the core while passing through the cooler, and some will remain when drawn. However, in this case also and more than in the previous instance, recarbonization will take place, more because the high specific heat of the calcium carbonate core will be supplying heat necessary to carry on dissociation at its surface, creating a favorable state for decarbonization in one zone so to speak, while the cooling of the external layer will be creating a favorable state for recarbonization in the adjacent zone. As CO_2 can be absorbed quite readily under a given vapor tension exerting itself one way as it can be given off when acting the other way, much can take place in only a few inches of space. It should be remembered that the dissemination is perfect—different from any man-made absorber. The intimacy of CO_2 and CaO is molecular. The pathways are smaller than the CO_2 molecule. In fact, the molecule has to distort itself to be able to pass singly past the CaO cells.

The CO_2 slinking its way through

the narrow spaces outward reaches a point where CaO grabs it. There is an immediate expansion and that particular path is closed to everything including water. There are other paths open to further CaO particles down that way, but these similarly may become blocked which causes any CaO so isolated, even though not recarbonated, to become inactive. Recarbonation thus causes more than just its legitimate amount of impurity. It recarbonates some and isolates other CaO particles. Under artificially created conditions such as that of Fig. 5, recarbonation can be carried so far that availability becomes zero and while there is still CaO there it never would hydrate.

Making the Best Chemical Lime

Initially in this paper, we have promoted a logical system of temperature control on standard kilns of today as a means of making better lime from any stone and more particularly, better lime from relatively impure stone.

Earlier we presented facts which are an argument for considerably more than just that, since it is now plain that the best chemical lime will have virtually no core when it enters the cooler, have a rather low CO_2 content and be relatively soft-burned when it is drawn. This avoids as much as possible combinations with impurities or at least later harm from these combinations. What is also wanted is a uniform burn. One piece about the same as the other, the large the same as the small, the outside of the large about the same as the middle.

No kiln gives this sort of lime. The vertical kiln with large stone can not and the rotary with small stone is unable to do so. In the vertical kiln there is usually a great size difference, the smaller pieces will suffer a heat exposure likely many times that necessary, the largest pieces may barely be burned. Often they will be drawn with core, and although the core may be removed in sorting, the escaping CO_2 during the process of cooling has done irreparable damage.

Even in the case of lime drawn without core it is unlikely that recarbonation has taken place, core may have been present when lime entered the cooler, it may have burned out but the CO_2 did not escape, it could readily have been entirely reabsorbed by the surrounding lime. It certainly was reabsorbed if that lime was cooled below dissociation point. It is only lime which enters the cooler coreless that makes the best of chemical lime.

Assume that the kiln is not exceptionally well operated and that lime is not of exceptional purity, that it contained low melting point eutectics, the slags played havoc with CaO in the small pieces and the core did the same in the large. The CaO of the small pieces made hydrate of one characteristic, that of the large another. This obtains when conditions are poor, but even when they are good, even when they are the best by special arrangemnts now known but not always practiced, still lime made in vertical kilns from large stone will not be the best, because when stone is large its surface needs to be heated unduly high to assure complete calcination of its inner portions.

One would think that the rotary kiln would present the solution and give uniform lime but it hardly does any better than the vertical kiln. The reason for this is the necessary high temperatures of the rotary to assure adequate heat transfer as most heat is transferred by radiation. If a high temperature differential is not maintained, kiln capacity and efficiency are greatly lessened making operation economically unsound.

The second reason is segregation. The heavier stone rides the outside and becomes repeatedly and unnecessarily often exposed to the intense heat causing it to become flash burned. The lightest of the charge rotates in the middle and never penetrates to the surface. It is this which may likely deliver core, the core will be small but will have proportionately the same recarbonating effect although likely in extent less than in a poorly operated vertical kiln.

The solution seems to lay with the improved vertical kiln. There are two possibilities; one simple but not entirely complete, the other more complex in some respects but at the same time also satisfying the demands in full.

The simple solution dictates that all vertical kilns should be arranged for hot zone recirculation, aiding distribution and tempering excessive heat. By this arrangement lime is burned in a much greater volume of relatively cool gases, while ordinarily it is burned in a small volume of much hotter gases. Lower temperature helps greatly, and with the volume greater, improves distribution, driving gases into every section of the hot zone from which core may enter the cooler. By this system core is reduced, so is recarbonation and also the damaging effect of flowing slags.

However, temperatures still need to be fairly high because stone is large, and the operation is in a manner intermittent because the kiln is drawn every two to four hours, allowing some of the lime to remain in the highest heat for a time far beyond anything necessary.

The final solution seems to be a vertical kiln designed for calcination of small stone. This stone may be either of 1 x 2 in. size or 1½ x 3 in. but the smaller it is within practical limits the lower will be the necessary time—temperature effect to calcine it.

But it is not only because the smaller the stone the lower the temperature required but also because with such stone automatic lime drawing may be resorted to. The charge would thus travel continuously through the hot zone with each piece being allowed the same heat effect.

Such a kiln would also be arranged for hot gas recirculation, of course, as it is by this means that temperature control would be obtained and lime quality controlled to within the desired degree. The lime would be free flowing and lime quality control would be obtained by either raising or lowering the rate of flow or the degree of temperature.

Calcination of small stone presents numerous advantages:

1. The smaller the stone the greater is the surface exposure which doubles when stone is of half size. Surface is direct inverse of stone size.

2. The smaller the stone the less heat penetration required which again is in direct inverse of stone size.

3. The smaller the stone the higher is the heat transfer rate (surface conductance) at the same gas velocity. Friction, of course, is higher too, the two factors being independent.

4. Small stone allows higher gas velocity without undue increase in terminal temperature which is reflected in better fuel ratio.

5. Small stone allows operation at low temperature in the hot zone, therefore at free flow without hanging, which in turn permits full mechanical drawing of lime, either continuous or intermittent, of say once every 15 minutes.

6. Small stone will give softer burned lime because surface heat transfer temperature effect needs to be less.

7. Small stone will also give softer burned lime because time of required exposure to heat is much less.

8. Due to lower necessary temperatures and shorter required time of calcination, calcium oxide combinations with other compounds are less likely to take place.

9. Availability and reactivity, plasticity, workability, volume of putty, all such characteristics become enhanced.

10. In case of dolomite, magnesia will be soft burned, more readily hydrated and lime of immediate and higher plasticity.

11. Impure stone will give much better lime if calcined in small sizes at lower temperature and shorter time.

12. Small stone will give a lime of less core, because core will be nearer the surface and therefore more readily calcined. Also, due to lower temperatures, more lime could be carried in the kiln without harm to the lime or the kiln lining.

13. With small stone, terminal temperature approach at the end of the various kiln zones would be much closer; waste gas temperature less, and kiln efficiency higher.

Unique Method of Adjusting Weir Length Increases Capacity

By NATHAN C. ROCKWOOD

THE ARTICLE in our June issue on "Recent Progress in Sand Classification" has produced a most interesting correspondence; and this permits us to present something really novel in commercial sand separating devices.

It may be recalled that the purpose of the article in the June issue was to put particular emphasis on the overflow weir length as the determining factor in the amount of fine sand that could be recovered. In the days of the late Edmund Shaw, whose articles on sand separation by hydraulic methods (available now in booklet form) were published serially in ROCK PRODUCTS, the whole attention in settling devices was focused on lengthening the settling box or increasing the diameter of the tank to give sufficient time for a sand particle of given size to settle out of the horizontal surface current. Nothing was said about reducing the current velocity and lessening its depth by increasing the length of the overflow weir.

From the discussion in the June article it is obvious, of course, that the same result as providing a long box with an end weir can be accomplished by having a wide weir at the end of a shorter tank, or by extending the weir around three or four sides of the tank, or as in the case of a cylindrical hydroseparator, by using the entire circumference for a weir. The length of the weir or the horizontal velocity over the weir can be readily determined from the Francis formula for flow over weirs, $Q = \frac{2}{3}C\sqrt{2gH} \times L \times H$ or $Q = \frac{2}{3}C\sqrt{2g} \times L \times H^{3/2}$, in which

Q = volume of flow

C = a constant for the weir, ordinarily about 0.62

H = the head on the weir

L = the length of the weir

g = acceleration due to gravity (32.2 ft. per sec.)

$\sqrt{2gH}$ = velocity over weir

For those who want a more accurate formula for very low heads, the following may be used:

$$Q = \frac{2}{3}C\sqrt{2g} \times L \times H^{1.455}$$

Lengthening the Weir

When that article was published we did not know that at least one manufacturer had developed an ingenious method of increasing and adjusting weir lengths, so that it should be possible not merely to recover fine sand, but to recover any particular percentages desired of the various size gradations of sand. The Webster Manufacturing Co. has developed such a device to be applied to sand drags and screws as well as to any simple settling tank. Patents have been granted for this device, we are informed. The same idea could be used with variations in any type of settling tank, including hydroseparators, to reduce the diameter ordinarily required. We are indebted to Albert Williams of the Webster company for calling our attention to this new machine, the essential features of which are shown in the accompanying sketches (Figs. 1, 2, and 3).

It will be seen from the drawings that these essential features are a downspout feed into the lower part of the tank, with rising current sorting columns placed above in the tank, in a self-contained compartment. These sorting columns overflow to a series of parallel weirs, forming overflow downspouts cross-wise of the compartment. These are parallel flumes, connected to a common overflow waste flume on the side. The most novel feature of the device is provision for adjustable lips on the parallel overflow spouts, so that the height of each weir may individually be raised or lowered. It must be remembered that each sorting column, while taking a common feed from the rising current below, is separate and distinct and has its own overflow weirs on different spouts.

By providing a series of 6½ pairs of overflow weirs, each 4-ft. long, the total weir length is 13 × 4 = 52 ft. (the weir on the right end, Fig. 1, has only one overflow edge). The rising current sorting columns in the sand drag illustrated in Fig. 1 have an area of 3120 sq. in., or better than 21.6 sq. ft. It is said that to make a separation at 100-mesh, 600 g.p.m. is required and the capacity is 50 to 60 tons of sand per hour.

Capacity Calculations

To check this, we will take the 600 g.p.m. or 600 × 60 = 36,000 gal. per hour; and since one gallon of water weighs approximately 8⅓ lbs., this is about 150 tons of water per hour. With 50 tons of sand this would be about a 3 to 1 dilution on an absolute weight basis, or better than a 5 to 1 dilution on a volume basis, as used in sand and gravel dredging operations

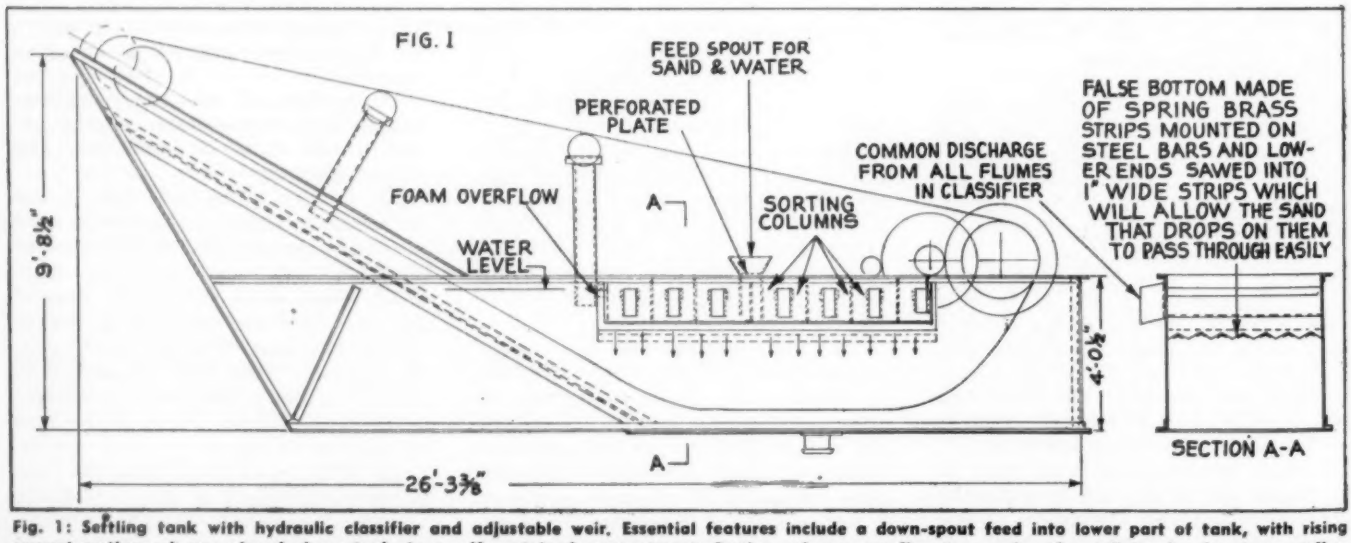


FIG. 1
FEED SPOUT FOR SAND & WATER
PERFORATED PLATE
FOAM OVERFLOW
WATER LEVEL
A
SORTING COLUMNS
COMMON DISCHARGE FROM ALL FLUMES IN CLASSIFIER
FALSE BOTTOM MADE OF SPRING BRASS STRIPS MOUNTED ON STEEL BARS AND LOWER ENDS SAWED INTO 1" WIDE STRIPS WHICH WILL ALLOW THE SAND THAT DROPS ON THEM TO PASS THROUGH EASILY
9'-8½"
4'-0"
26'-3⅜"
SECTION A-A

Fig. 1: Settling tank with hydraulic classifier and adjustable weir. Essential features include a down-spout feed into lower part of tank, with rising current sorting columns placed above tank, in a self-contained compartment. Sorting columns overflow to a series of parallel weirs, forming overflow down-spouts crosswise of the compartment. The height of each weir may be individually raised or lowered

with sand at 110 lbs. per cu. ft. and water at 62.5 lbs. This dilution agrees with standard practice, and could be decreased if it was desired to waste more fines, or the proportion of solids could be increased.

Assuming that the sand discharged carried one-third of its weight of water, 17 tons of feed water goes out with it, leaving 133 tons per hour to overflow the weirs. This is about 4265 cu. ft. per hour or 1.85 cu. ft. per sec. We now have

$$1.85 = \tfrac{2}{3}C\sqrt{2g} \times L \times H^{3/2}$$
$$= 0.42 \times 8 \times 52 \times H^{3/2}$$

$$\text{or } H^{3/2} = \frac{1.85}{0.42 \times 8 \times 52} = 0.011$$

approximately

An $H^{3/2}$ of 0.011 corresponds to an H, or head, of 0.047 ft., or approximately ½ in.

The velocity over a weir 52 ft. long with a head of 0.047 ft., can be calculated from the formula:

$Q = V \times A$ (Velocity × Area of Flow)

or $1.85 = V \times 52 \times 0.047$ in which

$$V = \frac{1.85}{52 \times 0.047} = 0.76 \text{ ft. per sec.}$$

The width of the sorting columns appears to be 10 in., or the average horizontal current at the top to the overflow weir is 5 in. or 5/12 ft. long. The time required for a particle rising in the center of the column to flow 5/12 ft. at a velocity of 0.76 ft. per sec. would be $5/12 \div 0.76 = 0.55$ sec. A 100-mesh particle falls at the rate of about 0.8 in. per sec. or it would fall about 0.45 in. in 0.55 sec. Theoretically, it would have to fall 0.5 in. to fall below the effect of the surface current over the weir.

However, we know that our formula gives somewhat over-estimates for such very low heads; and of course, this installation was not designed to save much of the 100-mesh, but to make the separation at 100-mesh.

Rising Current Velocity

Now let us calculate the rising current velocity for a 1.85 cu. ft. per sec. overflow through an area of 21.6 sq. ft. in the sorting columns. This is about 0.85 ft. per sec., or about 10 in. per sec. Obviously, this is intended to about balance the average velocity over the weirs. The falling rate of 4-mesh particles is a little more than that; so the rising current would keep the minus 4-mesh and finer particles in suspension until the flow velocity over the weir carried most of the finest particles away. The particles falling below the bottoms of the sorting columns, except near the inlets where there is some turbulence, would fall in relatively still water, except for the agitation of the slow moving drag.

The foregoing is the simplest analysis of operation that can be made. Actually, of course, the laws of hindered settling enter the picture and the settling rates assumed for velocity of fall in clear water would not hold, and the liquid settling medium itself would have a specific gravity greater than 1, because of the particles in perpetual suspension. Under these conditions the falling rates would be slowed up, and more of the finer particles would be overflowed. If it was desired to save more fines, either greater dilution or more weir length would be required.

The interesting feature of the device described is that by raising or lowering the weir lip of any one or more weirs, the velocity in that particular sorting column, and the weir overflow velocity can be varied. This would permit wasting fines or even intermediate sizes in one column and saving them in another, so that, conceivably, the percentage of the various sizes in the final product could be controlled with a considerable degree of accuracy.

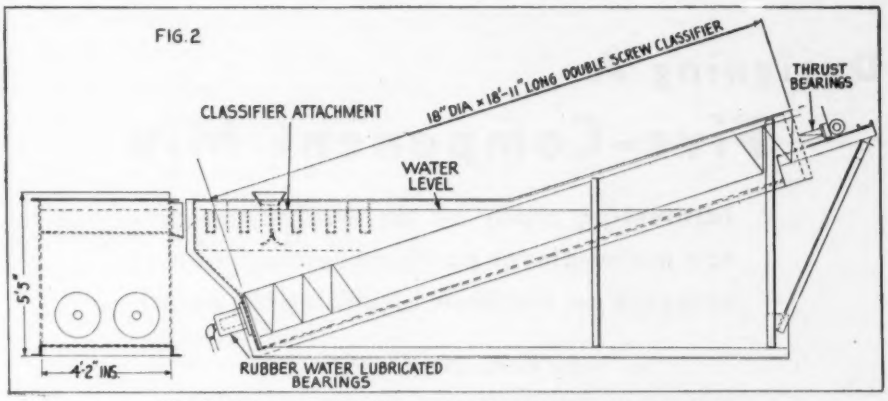


Fig. 2: Twin screw classifier equipped with adjustable weir device

Used for Limestone Sand

Mr. Williams tells us this type of classifier was developed within the past 10 years. We quote from his letter: "It was developed primarily for classifying stone sand in the limestone plants in northern Ohio where suitable natural sands are not obtainable from local sources. Its development was brought about at the time when Ohio State specifications forced us to retain no more than about 3 per cent of minus 100-mesh material in the sand. This presented a rather tough classification problem, as the specific gravity of all of the material was the same, and the fact that the feed sometimes contained as high as 50 per cent of minus 100-mesh material, did not help the classification problem."

Fig. 2 shows the classifier attachment fitted to a double-screw washer or classifier. Fig. 3 shows a dewatering application of the device, designed to overflow practically water, with a minimum of solids. In other words it is serving here similarly to a thickener. In this case the total area of the sorting columns is 5040 sq. in., and the total weir length is 84 ft. It is designed to settle 100- to 120-mesh limestone particles, which have a settling rate of 18 mm. (0.71 in.) per sec. The depth on the overflow weirs is estimated at 9/32 in. at 940 g.p.m. The spigot flow is estimated to 280 g.p.m. of which 40 tons or 21 per cent are solids. The sand pump delivers the spigot discharge to a sand classifier.

Quoting Mr. Williams again: "Since developing this unit for the stone industry, we have had occasion to use a number of them in connection with the large natural sand dredges working on the Ohio River and they have been extremely successful.

"The outstanding feature of this classifier is that it can be installed in almost any of the standard type and washers, either drag or screw type, and no additional head room is required for its installation. There are no moving parts other than the adjustable weirs to wear out, and as stated in your article, the extremely long weirs and absence of turbulence of the water in the sorting columns, being essential to close classification, are accomplished with this machine."

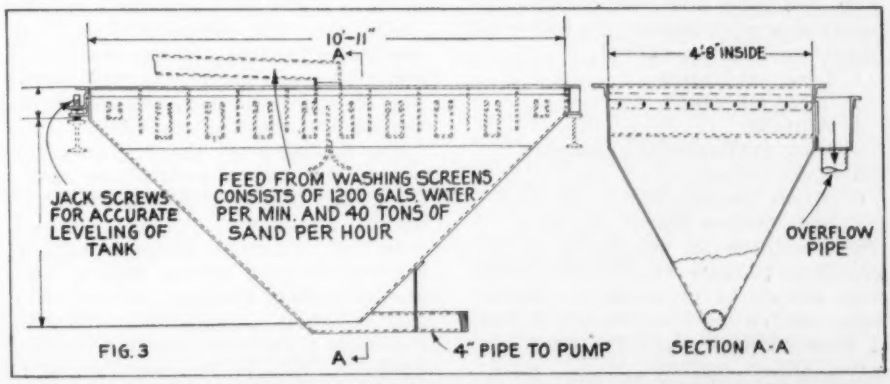

10'-11"
A
4'-8" INSIDE
JACK SCREWS FOR ACCURATE LEVELING OF TANK
FEED FROM WASHING SCREENS CONSISTS OF 1200 GALS. WATER PER MIN. AND 40 TONS OF SAND PER HOUR
OVERFLOW PIPE
FIG. 3
A
4" PIPE TO PUMP
SECTION A-A

Fig. 3: Settling tank equipped with adjustable weir device with the product drawn off by pump

Designing A Five-Component Mix

Interesting study of the evaluation of raw materials for portland cement manufacture on the basis of analytical data

By R. A. LOVELAND

SUMMARY

• The design of raw mixes for portland cement clinker is discussed. Methods for evaluation of raw materials for portland cement manufacture on the basis of analytical data are given, and tables and a diagram to facilitate the calculations are appended. A simple arithmetical solution to the problem of proportioning *N* materials to control *N*-1 constituents is illustrated by an example in which five (5) materials are combined to control four (4) constituents.

WHEN the manufacture of Portland Cement was started in the United States, a limited quantity of cement rock was available, which according to the standard of the period was of the correct composition[1] for the manufacture of that product.

This ideal situation did not long continue and due to more stringent requirements, extension of the industry into other areas, and exhaustion of this most desirable raw material, it became generally necessary to proportion two materials to obtain a satisfactory composition.

Where two materials only are considered their evaluation consists of accurate analysis and a few simple calculations to show limits of portland cement clinker composition available.

Due to depletion of the most favorable raw materials, the desire to locate cement plants near favorable markets and the recognition of a number of different cement compositions, etc., a third raw material has become common, a fourth is in use at some plants, and for those who wish to look to the future a fifth becomes of interest.

This evolution has enormously complicated the evaluation and presentation of data. No recent comprehensive paper on this subject has come to my attention though L. A. Dahl[2] has in his papers from time to time used methods which suggested what follows and Dr. J. C. Witt[2a] published in 1938 a method for the design of 4-constituent clinker compositions, the use of which inspired this effort.

In designing mix compositions for portland cement clinker, the following factors may be considered:

1. Lime saturation
2. Total silicates
3. Alumina
4. Flux available for clinkering
5. MgO content
6. Minor constituents
7. Specification limits

The methods for calculation of potential tri-calcium silicate and di-calcium silicate as presented by Bogue[3] were selected to represent the degree of lime saturation and the total silicates. Other methods might serve: for instance, the Newberry formula.[4] The limitations of these methods should be kept in mind. It is not necessary for this purpose that these potential compounds actually be present in the clinker.

High potential tri-calcium silicate is considered necessary for high-early-strength at this time and practically all the hardening properties are attributed to silicates.

The alumina, or perhaps more properly the potential tri-calcium aluminate, affects the setting, and the hardening properties. For purposes of evaluation of Type I clinker raw materials, 7.5 per cent maximum for alumina and 15 per cent for potential tri-calcium aluminate are suggested as per the United States federal specifications. (Federal Specification for Cements Portland, SS-C-192.)

The flux is the liquid present at clinkering temperatures. The higher calcium silicates are not liquid at these temperatures. It is believed that the lime and silica go into solution in the flux and crystalize out as the above silicates.

Lea and Desch[5] give the following formula for liquid at 1450 degrees C.:

Liquid = 3.0 Al_2O_3 + 2.2 Fe_2O_3 + MgO + alkalies.

This may also be expressed:

Liquid = 1.13 C_3A + 1.35 C_4AF + MgO + alkalies.

C_3A = Potential tri-calcium aluminate.

C_4AF = Potential tetra-calcium alumino ferrite.

The importance of the potential liquid and the ease of burning was early recognized; the familiar ratio of SiO_2/R_2O_3 is much used in this connection. The range of 2 to 3 is considered normal, mixes having 3 and higher are likely to be hard burning; 2, and lower may cause difficulties such as rings in the kilns.

On the basis of the formulas for liquids any normal composition showing 25 per cent or more should not be difficult to clinker.

In this connection improvements in refractories now permit higher temperatures than formerly and successful operation is now obtained with materials previously considered undesirable. It may be assumed that with higher temperatures the volume of liquid increases by inclusion of CaO and SiO_2.

MgO is a flux as noted above. It is also a potential source of delayed expansion[6] with attendant damage to the concrete and is limited to 5 per cent by the specifications.

All the other oxides in the raw mix on the ignited basis except CaO, SiO_2, Al_2O_3, Fe_2O_3, and MgO are considered as minor constituents. These include alkalies, SO_3, P_2O_5, TiO_2 and Mn_2O_3. Sulphur may also occur as sulphides. Cements with relatively high alkali content yield concretes that expand excessively with certain aggregates.[7] Some specifications have limited alkalies to 0.6 per cent where alkalies equal Na_2O + 0.658 K_2O_3. The effect of phosphates is discussed briefly by Lea and Desch.[8] Too little is known about the others. Any abnormality in this regard should be investigated.

Federal[9] limitations on the five types are as follows:

	I	II	III	IV	V
MgO	5.0	5.0	5.0	5.0	4.0
SO_3	*2.5	2.0	*3.0	2.0	1.75
SiO_2	—	21.0	—	—	23.00
Al_2O_3	7.5	6.0	—	—	4.0
Fe_2O_3	6.0	6.0	—	6.5	4.0
C_3S	—	< 50	—	< 35	—
C_2S	—	—	—	> 40	—
C_3A	< 15	< 8.0	< 15	< 7.0	< 5.0
C_4AF	—	—	—	—	—

*If C_3A is more than 8.

[1] **History of the Portland Cement Industry in the United States,** Robert W. Leslie, page 52.

[2] **The Problems of Proportioning Portland Cement Raw Mixtures,** L. A. Dahl, **Rock Products,** April, 1947, page 122.

[2a] J. C. Witt, **Concrete,** Cement Mill Section, 46, 265, 284 (1938).

[3] R. H. Bogue, **Industrial and Engineering Chemistry,** Anal. Edition, 1 (4) 192, 1929.

[4] Richard K. Meade, Portland Cement, 3rd Edition, page 77.

[5] **The Chemistry of Cement and Concrete,** F. M. Lea and C. H. Desch, page 108, (1937).

[6] **Chemistry of Cement and Concrete,** F. M. Lea and C. H. Desch, page 216 (1937).

[7] **Influence of Cement and Aggregate on Concrete Expansion,** Thomas E. Stanton, **Eng. News Record,** 124 59 (Feb., 1940).

[8] **The Chemistry of Cement and Concrete,** F. M. Lea and C. H. Desch, page 70 (1937).

[9] Federal specification SS-C-192, May 20, 1946.

Note: In addition the alkalies, $Na_2O + 0.658\ K_2O$, may be limited to 0.60 in any of these types.

In the (page 92) table C_3S, C_2S, C_3A, and C_4AF represent the following compounds, tri-calcium silicate, di-calcium silicate, tri-calcium aluminate, and tetra-calcium alumino ferrite, respectively.

For the purposes of discussion, we will consider a prospective cement plant quarry location[10] where clay overlays a strata of high magnesium limestone which in turn overlays a high calcium low-magnesium limestone.

Preliminary investigations have indicated that the clay is deficient in both iron and aluminum oxides. Sources of high iron oxide and high alumina material were found at some distance from the location and representative samples obtained.

Typical analyses of the five materials are as follows:

RAW MATERIALS COMPOSITIONS

No.	1 SiO_2	2 Al_2O_3	3 Fe_2O_3	4 CaO	5 MgO	6 Loss	7 Total	100-total	100-loss	100/100-loss
1	5.2	1.1	0.6	48.5	2.9	41.4	99.7	0.3	58.6	1.70648
2	61.8	16.0	3.8	4.4	2.0	9.8	97.8	2.2	90.2	1.10865
3	14.0	54.7	15.3	0.1	0.2	12.4	96.7	3.3	87.6	1.14155
4	16.1	1.1	81.6	0.0	0.0	1.2	100.0	0.0	98.8	1.01215
5	18.6	4.0	4.2	34.0	6.2	32.5	99.5	0.5	67.5	1.48148

No. 1—limestone, No. 2—Clay, No. 3—Diaspore, No. 4—pyrite cinder, No. 5—magnesium limestone.
Note: only one decimal is retained in the analyses. In ordinary routine work the second decimal is rarely significant.

The column headed 100-total will be carried through the calculations for checking the computations, a short cut in this regard.

The reciprocals were taken from table in Kent's *Engineering Handbook*.

The next step is to put the raw materials on the ignited basis. Where no contamination may be assumed this is also on the clinker basis. Note that two decimals are retained to prevent computational errors getting into the first decimal place. Ordinarily little is gained by this extra computational effort. If no calculating machine is available this may be done with an adding machine or partly by longhand and partly by the 10-in. slide rule; thus, for CaO on the ignited basis for material No. 1

	1.70648	Reciprocal for Mat. No. 1
	50	Longhand
	85.32	
Minus 1.706 × 1.5	—2.56	10-in. slide rule
	82.76	CaO material No. 1 ignited basis

RAW MATERIALS IGNITED BASIS

No.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Total	Diff.	Cal. diff.	
1	8.87	1.88	1.02	82.76	4.95	99.48	0.52	0.51	Limestone
2	68.51	17.74	4.21	4.88	2.22	97.56	2.44	2.45	Clay
3	15.98	62.44	17.47	0.11	0.23	96.23	3.77	3.77	Diaspore
4	16.30	1.11	82.59	0.00	0.00	100.00	0.00	0.00	Pyrite Cinder
5	27.56	5.93	6.22	50.37	9.19	99.27	0.73	0.74	Magnesium Limestone

These calculations are best made with a calculating machine. The compound composition slide rule can not be used because the values are in general outside its range.

The attached tables are a substitute which reduces the work to addition and subtraction. Note that each term in an equation is obtained by entering the table twice or three times and shifting the decimal point when necessary. Thus:

Al_2O_3 of sample No. 2 = 17.74
Fe_2O_3 of sample No. 2 = 4.21

Enter Table 7 with 17, then 74. Get 45.06 and 196.13 196.13/100 equals 1.96. Then 45.06 + 1.96 equals 47.02 equals 17.74 × 2.6504. Also enter Table 8 with 40 and 21, and get 67.68 and 35.53

Material No. 5 $\frac{\text{Flux}}{SiO_2} = \frac{1.14 \times 5.19 + 1.35 \times 18.93 + 9.19 = 1.48}{27.56}$

Material No. 2 $\frac{\text{Flux}}{SiO_2} = \frac{1.14 \times 39.89 + 1.35 \times 12.81 + 2.22 = 0.95}{68.51}$

Also the ratio of Fe_2O_3 to Al_2O_3 is more desirable:
Material No. 5 Fe_2O_3/Al_2O_3 equals 1.05
Material No. 2 Fe_2O_3/Al_2O_3 equals 0.24

Note that the totals of all the analyses on the ignited basis are less than on the "as analyzed" basis, except No. 4 which remained 100. Also the calculated differences closely equal the actual differences. Inspection indicates that none of these materials have an analysis on a clinker basis that approaches a portland cement composition.

The next step is to determine the potential compound composition of these ignited raw materials according to the formulas:[11]

$C_3S = 4.0710\ CaO - 7.6024\ SiO_2 - 6.7187\ Al_2O_3 - 1.4297\ Fe_2O_3$
$C_2S = 2.8675\ SiO_2 - 0.75436\ C_3S$
$C_3A = 2.6504\ Al_2O_3 - 1.6920\ Fe_2O_3$
$C_4AF = 3.0432\ Fe_2O_3$

$$\frac{67.68}{\quad} + \frac{35.53}{100} = 6.77 + 0.36 = 7.13$$

$$C_3A = 47.02 - 7.13 = 39.89$$

This will be handled more systematically in tables on pages 96-98.

Now we have a considerable array of figures, among which are negative percentages and percentages which are more than 100. If the use of these numbers appears fantastic to you then I recommend to you "Mathematics for the Million," by Hogben.

If we consider material No. 5, the negative C_3S indicates that a considerable quantity of calcined high calcium limestone would be required to bring the CaO content to the point that all the silica could be in the form C_2S. The 119.15 per cent C_2S indicates the excess of silica over that necessary to unite with the lime to form C_2S.

The higher flux content of this material with relation to the silica than the clay which is deficient in this regard suggests its use in the raw mix, thus: (See table at top of page.)

The higher $\frac{Fe_2O_3}{Al_2O_3}$ ratio would result in lower potential C_3A in the clinker.

Material No. 5 can only be used in percentages which will not bring the MgO above 5.0 per cent.

Material No. 3, diaspore, is a high alumina admixture and the pyrite cinder is a high iron admixture.

From an economic standpoint, the clay is assumed to overlay the high magnesium limestone in excess which in turn overlays the high calcium limestone located near the proposed plant.

The diaspore and the pyrite cinder are assumed to come from a considerable distance.

Thus the clay is the cheapest material, the high magnesium limestone next, and the high calcium limestone third. However, all three are much cheaper than the diaspore or pyrite cinder.

Note that all the materials are deficient in lime except No. 1, therefore we are going to mix a sufficient quantity of No. 1 with each of the others to bring the potential C_3S to 50 per cent which is the figure we have in mind for the Type I portland cement clinker.

[10] **Portland Cement Technology** by Dr. J. C. Witt, Chapter III (1947).

[11] **The Chemistry of Portland Cement**, by R. H. Bogue, chapter 10, page 187 (1947).

This is a simple two-material calculation, thus: Let a equal per cent of desired constituent in No. 1 raw material. Let b equal per cent of desired constituent in No. 2 material. Let D equal per cent of desired constituent in mixture. Then if x equals proportion of No. 1 material, $1 - x$ = proportion of No. 2 material

$$bx + a(1 - x) = D$$
$$bx + a - ax = D$$
$$a - D = ax - bx$$
$$x = \frac{a - D}{a - b}$$

It is handled conveniently on the following Form: (Tables A-1 to A-4).

We now have four mixtures which represent our five materials. Only the 1-2 mix has a portland cement composition, which we calculated from the proportions and the analysis as follows: (Table A-5).

Since the Al_2O_3 content of the 1-2 mix is 5.57 it is obvious that we will need an ingredient high in silicate and low in alumina to make Type V cement. (See Federal Specification SS-C-192.)

We should be able to improve the 1-2 mix by adding the 1-5 mix until the magnesia is 4.8 per cent.

The 0.2 per cent under the specifications is the assumed safety factor in this case to cover variations in analysis and control.

On this basis we make three combinations all of which will have 4.8 MgO content and 50 per cent potential tri-calcium silicate in the same manner as before. (Tables A-6–A-8.)

Of the three 3-material mixes calculated above, only the one made of 1, 2 and 5 materials could be used for portland cement manufacture even though all have 50 per cent C_3S and 4.8 per cent MgO.

The composition of the 1-2-5 mix is as follows: (Table B-1, page 95).

The flux content calculated from the formula given above of the 1-2-5 mix is 26 per cent against 25 per cent for the 1-2 mix. The lower potential C_3A is a further improvement.

The calculation of the proportions on the clinker basis was made as follows:

MIX 1—2—5

1. 0.76703 x 0.86128 = 0.066063
1. 0.33439 0.13872 = 0.04639
0.70702
2. 0.23297 x 0.86128 = 0.20065
5. 0.66561 x 0.13872 = 0.09233
Total 1.00000

The diagram, Fig. I, illustrates how the above calculation was set up.

The mix is still too low in flux for our ideal clinker so we will bring the C_4AF up to 10.00 per cent by combining 1-4 1-5 mix with 1-2 — 1-5 mix

(A-1)

1—2 MIX

Mat.	C_3S		Proportion	Potential Compound C_3S	C_2S	C_3A	Calculation C_4AF	MgO	Total	Cal. Total
	a	*a-D*	1-(2)							
1	255.39	205.39	0.76702	195.89	—128.26	2.50	2.38	3.80	76.31	76.30
	b	*a-b*	*a-D/a-b*							
2	—626.19	881.58	0.23298	—145.89	155.81	9.29	2.98	0.52	22.72	22.72
D	50			50.00	27.56	11.79	5.36	4.32	99.03	99.03

(A-2)

1—3 MIX

Mat.	C_3S		Proportion	Potential Compound C_3S	C_2S	C_3A	Calculation C_4AF	MgO	Total	Cal. Total
	a	*a-D*	1-(3)							
1	255.39	205.39	0.74980	191.49	125.38	2.44	2.32	3.71	74.58	74.59
	b	*a-b*	*a-D/a-b*							
3	—565.52	820.91	0.25020	—141.49	118.20	34.01	13.30	0.06	24.07	24.08
D	50			50.00	—7.18	36.45	15.62	3.77	98.65	98.65

(A-3)

1—4 MIX

Mat.	C_3S		Proportion	Potential Compound C_3S	C_2S	C_3A	Calculation C_4AF	MgO	Total	Cal. Total
	a	*a-D*	1-(4)							
1	255.39	205.39	0.59317	151.49	—99.19	1.93	1.84	2.94	59.01	59.01
	b	*a-b*	*a-D/a-b*							
4	—249.46	504.85	0.40683	—101.49	95.57	—55.65	102.25	0.00	40.68	40.68
D	50			50.00	—3.62	—53.72	104.09	2.94	99.69	99.69

(A-4)

1—5 MIX

Mat.	C_3S		Proportion	Potential Compound C_3S	C_2S	C_3A	Calculation C_4AF	MgO	Total	Cal. Total
	a	*a-D*	1-(5)							
	255.39	205.39	0.33438	85.40	—55.91	1.09	1.04	1.66	33.28	33.27
	b	*a-b*	*a-D/a-b*							
5	—53.18	308.57	0.66562	—35.40	79.31	3.45	12.60	6.12	66.08	66.08
D	50			50.00	23.40	4.54	13.64	7.78	99.36	99.36

(A-5)

1—2 MIX

Mat.	Proportion %	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	C_3S	C_2S	C_3A	C_4AF	Total oxides	Cal. Tot. oxides
1	76.70	6.80	1.44	0.78	63.48	3.80					76.30	76.30
2	23.30	15.96	4.13	0.98	1.14	0.52					22.73	22.73
Clinker		22.76	5.57	1.76	64.62	4.32	50.1	27.5	11.8	5.4	99.03	99.03

(A-6)

1—2 — 1—5 MIX

Mat.	C_3S		Proportion	Potential Compound C_3S	C_2S	C_3A	Calculation C_4AF	MgO	Total	Cal. Total
	a	*a-D*	1-(15)							
1-2	4.32	—0.48	0.86128	43.07	23.73	10.15	4.62	3.72	85.29	85.29
	b	*a-b*	*a-D/a-b*							
1-5	7.78	—3.46	0.13872	6.94	3.25	0.63	1.89	1.08	13.79	13.78
D	4.80			50.01	26.98	10.78	6.51	4.80	99.08	99.08

(A-7)

L 1—3 — 1—5

Mat.	C_3S		Proportion	Potential Compound C_3S	C_2S	C_3A	Calculation C_4AF	MgO	Total	Cal. Total
	a	*a-D*	1-(15)							
1-3	3.77	—1.03	0.74315	37.16	—5.34	27.09	11.61	2.80	73.32	73.31
	b	*a-b*	*a-D/a-b*							
1-5	7.78	—4.01	0.25695	12.84	6.01	1.17	3.50	2.00	25.52	25.52
D	4.80			50.00	0.67	28.26	15.11	4.80	98.84	98.84

(A-8)

1—4 — 1—5

Mat.	C_3S		Proportion	Potential Compound C_3S	C_2S	C_3A	Calculation C_4AF	MgO	Total	Cal. Total
	a	*a-D*	1-(15)							
1-4	2.94	—1.86	0.61571	30.79	—2.23	—33.08	64.09	1.81	61.38	61.38
	b	*a-b*	*a-D/a-b*							
1-5	7.78	—4.84	0.38429	19.21	8.99	1.74	5.24	2.99	38.17	38.18
D	4.80			50.00	6.76	—31.34	69.33	4.80	99.55	99.55

(B-1)

1—2—5 MIX

Mat.	Proportion % Clinker	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	C_3S	C_2S	C_3A	C_4AF	Total oxides	Cal. Tot. oxides
1	70.70	6.27	1.33	0.72	58.51	3.50					70.33	70.33
2	20.07	13.75	3.56	0.84	0.98	0.45					19.58	19.58
5	9.23	2.54	0.55	0.57	4.65	0.85					9.16	9.16
Clinker		22.56	5.44	2.13	64.14	4.80	50.0	26.9	10.8	6.5	99.07	99.07

(B-2)

1-2-1-5—1-4-1-5 MIX

Material	C_4AF		Proportion	Potential Compound C_3S	C_2S	Calculation C_3A	C_4AF	MgO	Total	Cal. Total
	a	*a-D*	1-(1415)							
1-2-1-5	6.51	—3.49	0.94444	47.23	25.48	10.18	6.15	4.53	93.57	93.58
	b	*a-b*	*a-D/a-b*							
1-4-1-5	69.33	—62.82	0.05556	2.78	0.38	—1.74	3.85	0.27	5.54	5.53
D	10.00			50.01	25.86	8.44	10.00	4.80	99.11	99.11

(B-3)

1-3-1-5—1-4-1-5 MIX

Material	C_4AF		Proportions	Potential Compound C_3S	C_2S	Calculations C_3A	C_4AF	MgO	Total	Cal. total
	a	*a-D*	1-(1415)							
1-3-1-5	15.11	5.11	1.09425	54.71	0.73	30.92	16.53	5.25	108.14	108.16
	b	*a-b*	*a-D/a-b*							
1-4-1-5	—69.33	—54.22	—0.09425	—4.71	—0.64	+2.95	—6.53	—0.45	—9.38	—9.38
D	10.00			50.00	0.09	33.87	10.00	4.80	98.76	98.76

(B-4)

1-2-4-5 MIX

Mat.	Proportion Clinker Basis%	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	C_3S	C_2S	C3A	C_4AF
1	69.52	6.17	1.31	0.71	57.53	3.44				
2	18.95	12.98	3.36	0.80	0.92	0.42				
4	1.39	0.23	0.02	1.15	0.00	0.00				
5	10.14	2.79	0.60	0.63	5.11	0.93				
Clinker		22.17	5.29	3.29	63.56	4.79	50.0	25.7	8.5	10.00

(B-5)

Material			Proportions	Potential Compound Calculations C_3S	C_2S	C_3A	C_4AF	MgO	Total	Cal. Total
1-2-1-5	*a*	*a-D*								
1-4-1-5	8.44	—1.56	0.93866	46.94	24.27	7.92	9.39	4.51	93.03	93.03
1-3-1-5										
	b	*a-b*	*a-D/a-b*							
1-4-1-5	—33.87	25.43	0.06134	3.07	0.01	2.08	0.61	0.29	0.06	6.06
D	10.00			50.01	24.28	10.00	10.00	4.80	99.09	99.09

FIG. I—DIAGRAM OF PROPORTION CALCULATIONS

Mat.	Proportions	Mixes	Proportions	Mixes	Proportions	Mixes	
1	0.76703	1-2	0.86128				
2	0.23297			1-2-1-5	0.94444		
1	0.33439	1-5	0.13872				
5	0.66561						
						1-2-1-5	0.93866
						1-4-1-5	
1	0.59317	1-4	0.61571				
4	0.40683			1-4-1-5	0.05556		
1	0.33439	1-5	0.38429				
5	0.66561						1-2-3-4-5
1	0.74981	1-3	0.74315				
3	0.25019			1-3-1-5	1.09425		
1	0.33439	1-5	0.25685				
5	0.66561						
						1-3-1-5	0.06134
						1-4-1-5	
1	0.59317	1-4	0.61571				
4	0.40683			1-4-1-5	—0.09425		
1	0.33439	1-5	0.38429				
5	0.66561						

and 1-3 — 1-5 mix by using the same form as before. (Table B-2–B-3.)

The 1-2-4-5 mix has the following proportions and composition calculated in the same manner as before: (Table B-4).

It is to be noted at this point that we could have specified the C_3A instead of C_4AF in the 1-2-4-5 mix to obtain any value less than the 10.78 per cent in the 1-2-5 mix as the negative C_3A value in the 1-4-5 mix would reduce C_3A rapidly in any mix to which it was added. By specifying slightly less than 8.0 per cent C_3A, a Type II cement would have resulted.

The 1-2-4-5 combination looks pretty good but we would like 10 per cent C_3A better on account of more flux and a margin above 8 per cent C_3A so that we may use 2.5 per cent SO_3 instead of 2.0 per cent SO_3 specified if C_3A falls below 8.0 per cent. Gypsum is much cheaper than clinker and this additional ½ of 1 per cent is beneficial.

So we combine again: (Table B-5).

We now have a five material combination raw mix in which we have controlled the C_3S, the C_2S, the C_4AF, and the MgO.

Fig. I, Table 10 and Table 11, demonstrates the methods of calculation from the mixes previously presented. (Page 96.)

It will be clear at this point to those who have followed through that this method may be applied to the proportioning of *N* materials for *N*-1 constituents or calculated potential compounds providing a solution which can be interpreted physically is possible. I have found solutions involving negative proportions may also be made by this method.

One precaution not apparent from the above is that the combinations must be selected so that the desired product may be obtained either by addition of the materials or by the subtraction of one from the other. This will not be difficult if a practical solution is possible.

It is suggested that the proportion of the compound or oxide present in the final product in the largest percentage be considered first, and the others in the order of their importance. The impractical solutions will be found quickly by this method.

(Continued on page 96)

*Table 10 completes calculations from Fig. 1.

TABLE 10: MIX 1-2-3-4-5

1. $0.76703 \times 0.86128 \times 0.94444 \times 0.93866 = 0.58566$
1. $0.33439 \times 0.13872 \times 0.94444 \times 0.93866 = 0.04112$
1. $0.59317 \times 0.61571 \times 0.05556 \times 0.93866 = 0.01905$
1. $0.33439 \times 0.38429 \times 0.05556 \times 0.93866 = 0.00670$
1. $0.74981 \times 0.74315 \times 1.09425 \times 0.06134 = 0.03640$
1. $0.33439 \times 0.25685 \times 1.09525 \times 0.06134 = 0.00576$
1. $0.59317 \times 0.61571 \times -0.09425 \times 0.06134 = 0.00211$
1. $0.33439 \times 0.38429 \times -0.09425 \times 0.06134 = 0.00074$

0.69284

2. $0.23297 \times 0.86128 \times 0.94444 \times 0.93866 = 0.17788$
3. $0.25019 \times 0.74315 \times 1.09425 \times 0.06134 = 0.01248$
4. $0.40683 \times 0.61571 \times 0.05556 \times 0.93866 = 0.01306$
4. $0.40683 \times 0.61571 \times -0.09425 \times 0.06134 = -0.00145$

0.01161

5. $0.66561 \times 0.13872 \times 0.94444 \times 0.93866 = 0.008185$
5. $0.66561 \times 0.38429 \times 0.05556 \times 0.93866 = 0.01334$
5. $0.66561 \times 0.25685 \times 1.09425 \times 0.06134 = 0.01147$
5. $0.66561 \times 0.38429 \times -0.09425 \times 0.06134 = -0.00148$

0.10518

0.99999

Designing A Five-Component Mix

(Continued from page 95)

TABLE 11: 1-2-3-4-5 MIX

Mat.	1 Proportion Ignited Basis	2 x Reciprocal (From Page 7)	3 Proportion as analyzed Basis	4 Proportion as analyzed Basis	5 SiO_2	6 Al_2O_3	7 Fe_2O_3	8 CaO	9 MgO	10 Loss	11 Total	12 Cal. Total
1	0.69284	1.70648	1.18232	0.75724	3.94	0.83	0.45	36.73	2.20	31.35	75.50	75.50
2	0.17788	1.10865	0.19721	0.12631	7.81	2.02	0.48	0.56	0.25	1.24	12.36	12.35
3	0.01248	1.14155	0.01425	0.00913	0.13	0.50	0.14	0.00	0.00	0.11	0.88	0.88
4	0.01161	1.01215	0.01175	0.00753	0.12	0.01	0.61	0.00	0.00	0.01	0.75	0.75
5	0.10518	1.48148	0.15582	0.09980	1.86	0.40	0.42	3.39	0.62	3.24	9.93	9.93
Raw			1.56135	1.00001							58	
Mat.			0.64047		13.86	3.76	2.10	40.68	3.07	35.95	99.42	99.42
										64.05	0.58	
										Factor,	91	
				Clinker	21.64	5.87	3.28	63.51	4.79	1.56128	99.09	
					C_3S	C_2S	C_3A	C_4AF	4.79			
					49.9	24.4	10.0	10.0			99.10	

Liquid at 1450 C = 29.7 + Alkalies

NOTES: Column 1 times column 2 equals column 3. The reciprocal of the sum of column 3 is the factor used to multiply values in column 3 to obtain column 4. Sum of proportions in column 4 is one and percentages can be obtained by multiplying the proportions by 100.

Columns 5 to 10, inclusive, and 12 are obtained by multiplying values of SiO_2, Al_2O_3, etc. from table of raw material compositions by the corresponding values in column 4. Column 11 is the actual total of columns 5 to 10 inclusive, and should check closely with column 12. The sums of the values in columns 5 to 12, inclusive, is the raw material analysis.

The reciprocal of 100 — Loss, times the SiO_2, Al_2O_3, etc., in the raw material gives the clinker composition. Note that the calculated clinker has no loss and that the total is less than 100 by, 100 — raw material total, times reciprocal calculated as above. $1.56128 \times 58 = 0.91$.

Errors in the proportions in the fourth significant figure were pointed out by Mr. Dahl. This is due to loss of significant figures in the values used for determining proportions by subtraction beginning with the tabulation (1-2 — 1-5 Mix, etc.).

Where the desired MgO content 4.80 is subtracted from MgO in 1-2 Mix, the difference is —0.48, only two significant figures. In order to avoid this error, the MgO in the 1-2, 1-3, 1-4, and 1-5 mixes should be calculated to the third or fourth decimal place.

Acknowledgements

The author wishes to thank F. R. McMillan, assistant to the vice-president for Research and Development, Portland Cement Association, for guidance and helpful suggestions; L. A. Dahl, research chemist, Portland Cement Association Fellowship, Washington, D. C., for his careful checking and helpful criticisms, and H. H. Steinour, senior research chemist, Portland Cement Association, Chicago, for consideration and discussion of methods used.

MATERIAL NO. 1 Limestone

		C_3S +		C_2S	C_3A	C_4AF	MgO	Total
SiO_2	88.87	333.82	60.82	22.94	2.65	3.04		
			6.61	2.49	2.33	.06		
			6.72	25.43	4.98			
Al_2O_3	1.88	3.09	5.91					
			1.43	150.87				
Fe_2O_3	1.02		0.03	41.49	1.69			
				0.29	.03			
CaO	82.76	336.91	81.52	-192.65	1.72			
MgO	4.95	81.52		25.43				
Total	99.48	255.39		-167.22	3.26	3.10	4. 5	99.48

TABLE 1: CaO x 4.0710

$C_3S = 4.0710\ CaO — 7.6024\ SiO_2 — 6.7186\ Al_2O_3 — 1.4297\ Fe_2O_3$

	0	1	2	3	4	5	6	7	8	9
10	40.71	44.78	48.45	52.92	56.99	61.07	65.14	69.21	73.28	77.35
20	81.42	85.49	89.56	93.63	97.70	101.78	105.85	109.92	113.39	118.06
30	122.13	126.20	130.27	134.34	138.41	142.49	146.57	150.63	154.70	158.77
40	162.84	166.91	170.98	175.05	179.12	183.20	187.27	191.34	195.41	199.48
50	203.55	207.62	211.69	215.76	219.83	223.91	227.98	232.05	236.12	240.19
60	244.26	248.33	252.40	256.47	260.54	264.62	268.69	272.76	276.83	280.90
70	284.97	289.04	293.11	297.18	301.25	305.33	309.40	313.47	317.54	321.61
80	325.68	329.75	333.82	337.89	341.96	346.04	350.11	354.18	358.25	362.32
90	366.39	370.46	374.53	378.60	382.67	386.74	390.82	394.89	398.96	403.03

TABLE 2: SiO_2 x 7.6024

	0	1	2	3	4	5	6	7	8	9
10	76.02	83.63	91.23	98.83	106.43	114.04	121.64	129.24	136.84	144.45
20	152.05	159.65	167.25	174.86	182.46	190.06	197.66	205.26	212.87	220.45
30	228.07	235.67	243.28	250.88	258.48	266.08	273.69	281.29	288.89	296.49
40	304.10	311.70	319.30	326.90	334.51	342.11	349.71	357.31	364.92	372.52
50	380.12	387.72	395.32	402.93	410.53	418.13	425.73	433.34	440.94	448.54
60	456.14	463.75	471.35	478.95	486.55	494.16	501.76	509.36	516.96	524.57
70	532.17	539.77	547.37	554.98	562.58	570.18	577.78	585.38	592.99	600.59
80	608.19	615.79	623.40	631.00	638.60	646.20	653.81	661.41	669.01	676.61
90	684.22	691.82	699.42	707.02	714.63	722.23	729.83	737.43	745.04	752.64

(Continued on page 97)

Short Method for Clay Analysis

By F. A. LEE*

As it is very desirable that clay samples be analyzed quickly, the following short method may be found useful by cement plant chemists. It satisfactorily checks the results obtained by the double evaporation method.

The silicates are decomposed and changed into silicates of the soluble class by means of a sintering process, using calcium carbonate, sodium carbonate and potassium nitrate.

Using the sample of clay as prepared in the usual procedure, and passing the 100-mesh sieve, regrind this sample in an agate mortar to a very fine powder. This fineness aids greatly in promoting decomposition. Transfer this prepared sample to a small, clean, dry and well-stoppered bottle.

Take the weight of a clean platinum crucible, and record the weight. Transfer to this crucible sufficient C.P. calcium carbonate equivalent to 0.9 grams of calcium oxide; 1.5 grams of the prepared clay sample; 0.5 grams of sodium carbonate; and 0.5 grams of finely ground potassium nitrate.

Mix thoroughly in the crucible with a short, rounded-end stirring rod, brush off the rod and carefully compress the charge with a smooth flat surface, such as the bottom of a litmus paper vial. Place cover on crucible, and transfer it to the electric muffle furnace, which may be heated to around 600 deg. C. to start with. Turn on the full heat and in about an hour the temperature should be between 925 and 950 deg. C. Hold at this temperature for one-half hour. Remove the crucible from the furnace to a desiccator and when at room temperature, weigh. This weight minus the weight of the crucible, when divided by THREE will give the weight equivalent of a 0.5 gram of clay, plus the added 0.3 grams of CaO. Tap the very friable cake out of the crucible into a clean agate mortar, grind and mix the powder well, and transfer at once to a small, clean, dry and rubber stoppered bottle.

Silica: From this bottle weigh up as quickly as possible an amount equivalent to 0.5 grams of clay plus the added 0.3 grams of CaO, transfer to a 50 cc. beaker. From here on the procedure is the alternate method for silica in portland cement, A.S.T.M. 1946, except use 0.7 grams ammonium chloride and 7 cc. of HCl.

Iron and Aluminum Oxides: These oxides are precipitated in the filtrate from the silica. To make the washing of this ppt. much quicker, shake up one half a 9 cm. filter paper after

*Chief chemist, Gulf Portland Cement Co.

Designing A Five-Component Mix

(Continued from page 96)

TABLE 3: Al_2O_3 x 6.7186

	0	1	2	3	4	5	6	7	8	9
10	67.19	73.90	80.62	87.34	94.06	100.78	107.50	114.22	120.93	127.65
20	134.37	141.09	147.81	154.53	161.25	167.97	174.68	181.40	188.12	194.84
30	201.56	208.28	215.00	221.71	228.43	235.15	241.87	248.59	255.31	262.03
40	268.74	275.46	282.18	288.90	295.62	302.34	309.06	315.77	322.49	329.21
50	335.93	342.65	349.37	356.09	362.80	369.52	376.24	382.96	389.68	396.40
60	403.12	409.83	416.55	423.27	429.99	436.71	443.43	450.15	456.86	463.58
70	470.30	477.02	483.74	490.46	497.18	503.90	510.61	517.33	524.05	530.77
80	537.49	544.21	550.93	557.64	564.36	571.08	577.80	584.52	591.24	597.96
90	604.67	611.39	618.11	624.83	631.55	638.27	644.99	651.70	658.42	665.14

TABLE 4: Fe_2O_3 x 1.4297

	0	1	2	3	4	5	6	7	8	9
10	14.30	15.73	17.16	18.59	20.02	21.45	22.88	24.30	25.73	27.16
20	28.59	30.02	31.45	32.88	34.31	35.74	37.17	38.60	40.03	41.46
30	42.89	44.32	45.75	47.18	48.61	50.04	51.47	52.90	54.33	55.76
40	57.19	58.62	60.05	61.48	62.91	64.34	65.77	67.20	68.63	70.06
50	71.49	72.91	74.34	75.77	77.20	78.63	80.06	81.49	82.92	84.35
60	85.79	87.21	88.64	90.07	91.50	92.93	94.36	95.79	97.22	98.65
70	100.08	101.51	102.94	104.37	105.80	107.23	108.66	110.09	111.52	112.95
80	114.38	115.81	117.24	118.67	120.09	121.52	122.95	124.38	125.81	127.25
90	128.67	130.10	131.53	132.96	134.39	135.82	137.25	138.68	140.11	141.54

TABLE 5: SiO_2 x 2.8675

$C_2S = 2.8675\ SiO_2 - 0.75435\ C_3S$

	0	1	2	3	4	5	6	7	8	9
10	28.68	31.54	34.41	37.28	40.15	43.01	45.88	48.75	51.62	54.48
20	57.35	60.22	63.09	65.95	68.82	71.69	74.56	77.42	80.29	83.16
30	86.03	88.89	91.76	94.63	97.50	100.36	103.23	106.10	108.97	111.83
40	114.70	117.57	120.44	123.30	126.17	129.04	131.91	134.77	137.64	140.51
50	143.38	146.24	149.11	151.98	154.85	157.71	160.58	163.45	166.32	169.18
60	172.05	174.92	177.79	180.65	183.52	186.39	189.26	192.12	194.99	197.86
70	200.73	203.59	206.46	209.33	212.20	215.06	217.93	220.80	223.67	226.53
80	229.40	232.27	235.14	238.00	240.87	243.74	246.61	249.47	252.34	255.21
90	258.08	260.94	263.81	266.68	269.55	272.41	275.28	278.15	281.02	283.88

TABLE 6: C_3S x 0.75435

	0	1	2	3	4	5	6	7	8	9
10	7.54	8.30	9.05	9.81	10.56	11.32	12.07	12.82	13.58	14.33
20	15.09	15.84	16.60	17.35	18.10	18.86	19.61	20.37	21.12	21.88
30	22.63	23.38	24.14	24.89	25.65	26.40	27.16	27.91	28.67	29.42
40	30.17	30.93	31.68	32.44	33.19	33.95	34.70	35.45	36.21	36.96
50	37.72	38.47	39.23	39.98	40.73	41.49	42.27	43.00	43.75	44.51
60	45.26	46.02	46.77	47.52	48.28	49.03	49.79	50.54	51.30	52.05
70	52.80	53.56	54.31	55.07	55.82	56.58	57.33	58.08	58.84	59.59
80	60.35	61.10	61.86	62.61	63.37	64.12	64.87	65.63	66.38	67.14
90	67.89	68.65	69.40	70.15	70.91	71.66	72.42	73.17	73.93	74.68
100	75.44									
200	150.87									
300	226.30									
400	301.74									
500	377.18									
600	452.61									

TABLE 7: Al_2O_3 x 2.6504

$C_2A = 2.6504\ Al_2O_3 - 1.6920\ Fe_2O_3$

	0	1	2	3	4	5	6	7	8	9
10	26.50	29.15	31.80	34.46	37.11	39.76	42.41	45.06	47.71	50.36
20	53.01	55.66	58.31	60.96	63.61	66.26	68.91	71.56	74.21	76.86
30	79.51	82.16	84.81	87.46	90.11	92.76	95.41	98.06	100.72	103.37
40	106.02	108.67	111.32	113.97	116.62	119.277	121.92	124.57	127.22	129.87
50	132.52	135.17	137.82	140.47	143.12	145.77	148.42	151.07	153.72	156.37
60	159.02	161.67	164.32	166.98	169.63	172.28	174.93	177.58	180.23	182.88
70	185.53	188.18	190.83	193.48	196.13	198.78	201.43	204.08	206.73	209.38
80	212.03	214.68	217.33	219.98	222.63	225.28	227.93	230.58	233.24	235.89
90	238.54	241.19	243.84	246.49	249.14	251.79	254.44	257.09	259.74	262.39

TABLE 8: Fe_2O_3 x 1.6920

10	16.92	18.61	20.30	22.00	23.69	25.38	27.07	28.76	30.46	32.15
20	33.84	35.53	37.22	38.92	40.61	42.30	43.99	45.68	47.38	49.07
30	50.76	52.45	54.14	55.84	57.53	59.22	60.91	62.60	64.30	65.99
40	67.68	69.37	71.06	72.76	74.45	76.14	77.83	79.52	81.22	82.91
50	84.60	86.29	87.98	89.68	91.37	93.06	94.75	96.44	98.14	99.83
60	101.52	103.21	104.90	106.60	108.29	109.98	111.67	113.36	115.06	116.75
70	118.44	120.13	121.82	123.52	125.21	126.90	128.59	130.28	131.98	133.67
80	135.36	137.05	138.74	140.44	142.13	143.82	145.51	147.20	148.90	150.59
90	152.288	153.97	155.66	157.36	159.05	160.74	162.43	164.12	165.82	167.51

(Continued on page 98)

tearing it into small pieces, with 25 cc. water, in a small erlenmeyer flask, and add this to the filtrate before precipitating these oxides.

Calcium Oxide; This determination is made according to the alternate method for CaO in portland cement, A.S.T.M. 1946. The value of the potassium permanganate solution in grams of CaO per cc., multipled by the number of cc. required, minus the added 0.3 grams of CaO, multiplied by 200, will give the per cent of CaO in the sample of clay. As an example: Suppose one cc. of the potassium permanganate solution is equivalent to 0.005 grams of CaO, and the number of cc. required for titration is 65.0. Then 65.0 × 0.005 equals 0.325 grams CaO; 0.325 minus 0.300 equals 0.025 grams of CaO obtained from 0.5 grams clay. Per cent CaO in sample equals 0.025 × 2 × 100 equals 5.00.

Magnesium Oxide: This compound is precipitated in the filtrate from the CaO determination in the usual way.

Iron Oxide: Weigh up as quickly as possible from the small bottle, the same weight as was used for the silicon dioxide determination. Transfer to a 250 cc. beaker, add 25 cc. water at room temperature, stir and add 10 cc. HCl, place cover on beaker, set on the hot plate, and when all is dissolved except some silica, reduce with stannous chloride, and determine the iron oxide by the potassium dichromate method.

Aluminium Oxide: This compound is determined in the usual way, by subtracting the iron oxide from the combined weight of the iron and aluminum oxides.

To make clear the amount of the sintered mass that will equal 0.5 grams of clay plus the added 0.3 gram of CaO, the calculation is given: Example: weight of sintered mass plus crucible equals 22.7920; weight of crucible equals 20.1132; difference equals 2.6788. This weight 2.6788 divided by 3.0 will be the weight equivalent of 0.5 grams of clay plus the added 0.3 grams of CaO.

"Discontinuous Grading" of Concrete Aggregates

PROPORTIONING CONCRETE to make the aggregate mass as compact as possible and filling the void spaces in the mass with suitable cement paste is the primary problem in concrete construction. According to Jean Villey (France), this may best be attained by discontinuous or "step" grading of aggregate in the ratio of 10 (an ordinary coarse concrete would thus consist of particles of only three sizes, each being ten times larger than the next smallest). Following M. Caquot, Professor Villy defines the size of a particle as being equal to ten times its average radius, which is its volume divided by its surface area.

Advantages of step grading, M. Villy claims, are: (a) that with a

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(Continued from page 97)

TABLE 9: Fe_2O_3 x 3.0432

C_4AF 3.0432 Fe_2O_3

	0	1	2	3	4	5	6	7	8	9
10	30.43	33.48	36.52	39.56	42.60	45.65	48.69	51.73	54.78	57.82
20	60.86	63.91	66.95	69.99	73.04	76.08	79.12	82.17	85.21	88.25
30	91.30	94.34	97.38	100.43	103.47	106.51	109.56	112.60	115.64	118.68
40	121.73	124.77	127.81	130.86	133.90	136.94	139.99	143.03	146.07	149.12
50	152.16	155.20	158.25	161.29	164.33	167.38	170.42	173.46	176.51	179.55
60	182.59	185.64	188.68	191.72	194.76	197.80	200.85	203.89	206.94	209.98
70	213.02	216.07	219.11	222.15	225.20	228.24	231.28	234.33	237.37	240.41
80	243.46	246.50	249.54	252.59	255.63	258.67	261.72	264.76	267.80	270.84
90	273.89	276.93	279.97	283.02	286.06	289.10	292.15	295.19	298.23	301.288

MATERIAL NO. 2—Clay

		C_2S +	—	C_3S	C_3A	C_4AF	MgO	Total
			516.96	194.99	45.06			
SiO_2	68.51	16.28	3.88	1.46	1.96			
		3.58	114.22	196.45	47.02			
Al_2O_3	17.74		4.97		6.77			
			5.72		.36			
Fe_2O_3	4.21	19.86	0.30	452.61	7.13	12.17		
			646.05	19.61		.64		
CaO	4.88		19.86	0.14				
				472.36				
MgO	2.22			196.45				
Total	97.56		—626.19	668.81	39.89	12.81	2.22	97.54

MATERIAL No. 3—Diaspore

		C_2S		C_3S	C_3A	C_4AF	MgO	Total
	+		—					
			114.04	43.01	164.32			
SiO_2	15.98	0.45	7.45	2.81	1.17	51.73		
			416.55	45.82	165.49			
Al_2O_3	62.44		2.96		28.76	1.43		
			24.30		.80			
Fe_2O_3	17.47		0.67	377.18	29.56			
			565.97	49.03				
CaO	0.11		.45	0.39				
				426.60				
MgO	0.23			45.82				
Total	96.23		—565.52	472.42	135.93	53.16	0.23	96.22

MATERIAL No. 4—Pyrite Cinder

		C_2S +	—	C_3S	C_3A	C_4AF	MgO	Total
SiO_2	16.30	0.00	121.64	45.88	2.65	249.54		
Al_2O_3	1.11		2.28	0.86	.29			
			6.72	46.74	2.94			
Fe_2O_3	82.59		0.74					
			117.24	150.87	138.74	1.80		
CaO	0.00		0.84	36.96	1.00			
			249.46	0.35	139.74			
MgO	0.00			188.18	2.94			
				46.74	136.80			
Total	100.00		—249.46	234.92	—136.80	251.34	0.00	100.00

MATERIAL No. 5—High Magnesium Limestone

		C_2S +	—	C_3S	C_3A	C_4AF	MgO	Total
SiO_2	27.56	203.55	205.26	77.42	13.25			
		1.51	4.26	1.61	2.46	18.26		
Al_2O_3	5.93	205.06	33.59	79.03	15.71	.67		
			6.25					
Fe_2O_3	6.22		8.57	39.98	10.15			
			258.24	.14	.37			
CaO	50.37		205.06	40.12	10.52			
MgO	9.19							
Total	99.27		—53.18	119.15	5.19	18.93	9.19	99.28

Outstanding Promotion

KEYSTONE DIVISION of Dravo Corporation, Pittsburgh, Penn., has recently issued its Bulletin No. 700, which is an outstanding example of promotional presentation of this sand, gravel, ready mixed concrete and builders supply company's operation. (For detailed description of the entire operation, see ROCK PRODUCTS, Sept., 1939, p. 21.)

Published in 8½- x 11-in. page size (16 pages), the booklet has many large photographic illustrations that reproduce well on the glossy paper. The first two pages carry a short history of operations from 1902 to the present day, laying particular stress on the public service aspects of the business and describing "firsts" in dredging operations, etc., attributable to Keystone's management.

small number of constituent sizes manufacture can be more satisfactorily controlled. Even if continuous grading were particularly advantageous, it would be extremely difficult to apply in practice because it involves the maintenance of constant proportions between a theoretically infinite number of components. With the components few in number, and individually uniform, a uniform concrete is easily obtained; (b) that most favourable proportions can be determined more easily; and (c) that the concrete is not only more uniform in quality, but stronger and more durable for equal water/cement ratios.

M. R. Vallette (France) states that though he agrees with M. Villy as to the merits of step grading, too much depends on practical factors to enable a solution of the problem of quality concrete proportioning to be reached by purely theoretical reasoning. Abandoning theoretical considerations and relying on experience, M. Vallette finds that the best concrete is not the most compact, and bears no relation to the compactness of the aggregate mass. He has applied step grading to all types of concrete, and finds that a ratio of 8, or 6.3 between primary and secondary grades yields a more uniform concrete than the ratio of 10 suggested by M. Villey.

Diamond Drilling Tests

A REPORT ON DIAMOND DRILLING techniques employed in the preparation of blast holes at a large eastern magnetite development, the first of a series undertaken by the Bureau of Mines to describe current practices in diamond drilling for production purposes throughout the United States, has recently been released. The report discusses the relative merits of this method as compared with percussion drilling.

Principal advantages of diamond drilling blast holes at the mine in question, the publication states, include safer working conditions in open stopes, recovery of additional ore, a reduction in the amount of stope development, a continuous maximum production from stopes, and virtual elimination of dust from drilling. Disadvantages are the need for greater capital investment and the employment of highly skilled personnel to load and detonate the charge in long holes.

Detailed descriptions of the apparatus employed as well as a summary of the results obtained by diamond and percussion drilling are given in Information Circular 7393, "Diamond Drilling Blast Holes, Eastern Magnetite Mine A," which may be obtained by writing the Bureau of Mines, Department of Interior, Washington 25, D. C.

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In gasoline engines (in extra heavy-duty service): This full detergency means you avoid deposits and ring sticking due to oil oxidation—and other harmful deposits not caused by oxidation of heavy ends of unburned fuel which may pass the rings and contaminate the lubricating oil in the crankcase.

Holds idling pressures

High Viscosity Index of Gulflube H.D. insures high pressure gauge readings when your motor is idling.

Cuts down drag

You get a minimum of drag and frictional resistance when starting in cold weather.

Cuts oil consumption

Your rings stay clean with Gulflube H.D.; and that means you don't lose oil by pumping. Gulflube H.D. will not foam, nor corrode alloy bearings.

Ask any Gulf Representative to tell you more about Gulf's new detergent motor oil, Gulflube H.D. There's no obligation, of course.

Switch to GULF

GULFLUBE H.D.

Gulf's New Detergent Motor Oil for Diesel Engines and Gasoline Engines in Extra Heavy-Duty Service.

HAVE YOU TRIED THE

Walnut Test?

It shows why a New Holland 3030 Breaker means dollars in your pocket

Tie a walnut on a piece of string. Hold the string about a foot away from the nut and whirl the nut against a hard surface. It breaks with little effort in comparatively uniform pieces because the cracking force is evenly distributed.

Now crush a walnut between the jaws of a pair of pliers. The pressure necessary to do this pulverizes the middle section of the nut—yet leaves the ends in large, irregular pieces. Crushing force is confined to one small area and much greater effort succeeds only in producing an undesirable product.

The New Holland Model 3030 Stone Breaker reduces rock as the walnut on the string was broken—by impact. The product therefore, is uniformly cubical and the power requirement small. That means less waste fines . . . less power used . . . bigger profits. Write for illustrated descriptive booklet today.

NEW HOLLAND MANUFACTURING CO.
Mountville, Pennsylvania

Primary and Secondary Crushing In One Operation

NEW HOLLAND
DOUBLE IMPELLER BREAKERS

Labor Relations

(Continued from page 91)

to a history of responsible adherence to contract terms. Their reluctance to subscribe to a no-strike stipulation is obviously attributable to fear regarding the uncertainties of their financial responsibility for acts which they have neither authorized nor ratified rather than to an intention to retain the right to destroy the stability which contracts are intended to establish. Union refusal to rewrite no-strike clauses, therefore, ought not to be interpreted as any implied reservation on its part of a right to disavow the expressed conditions of an agreement by striking to change them during its term.

"As to the recalcitrance of individual employes, discipline, challengeable through impartial arbitration, rather than lawsuits, must continue to be relied upon. And an employer's necessary authority under these circumstances to invoke discipline will neither be destroyed nor embarrassed by omission of the clause in question."

Mr. Freidin believes that any union collective bargaining contract implies from its very nature that the workers covenant to work under the agreed upon conditions and for the wages agreed upon for the term of the contract, without interruption. If this were not the implication the agreement would be worthless, for it would then be cancelable at the union's option, despite the fact that no such option exists in the contract.

Meanwhile, a suit for damages against the United Steel Workers (C.I.O.) was filed in the U. S. District Court in Chicago, July 30, by the Globe company, asking $75,000 for alleged losses incurred from July 15 to July 30, and $30,000 for each additional week that the strike, in violation of an existing contract, may last. The decision in this case will cast some light on the position of the courts in assessing such damages.

Bentonite Depletion

AT THE LAST SESSION of Congress, Rep. Frank A. Barrett, of Wyoming, introduced HR-662, to grant a 15 per cent depletion allowance to bentonite. During the war, a similar depletion percentage had been allowed on ball clay, fluorspar, rock asphalt, flake graphite, vermiculite, beryl, feldspar, mica, talc, lepidolite, spodumene, barite and potash.

Final Figures on 1946 Gypsum Supply

GYPSUM mine output in the United States reached 5,629,398 short tons, and 1,457,140 tons were imported. This total of 7,086,538 tons of gypsum set a new supply record in 1946, 10 per cent above the previous record set in 1926 and 64 per cent above the 1945 figure. Calcined production, obtained from 50 plants distributed through 23 states, was 68 per cent higher than in 1945. The number of active plants increased by eight and active kilns by 19.

Building materials made the largest gains in products sold, with the use of portland cement retarder up 71 per cent, base coat plasters 135 per cent and lath up 91 per cent. Other building plasters and wallboard also made substantial gains, but sales of sheathing and laminated board declined.

Capacity of the gypsum industry to produce plaster and board has not been canvassed since 1941. There has been considerable variation in capacity due to the closing of some plants and increasing capacity of others, but the overall effect seems to have been an increase to at least 4,750,000,000 sq. ft. Capacity will be further increased in 1947 when several plants now under construction are placed in operation.

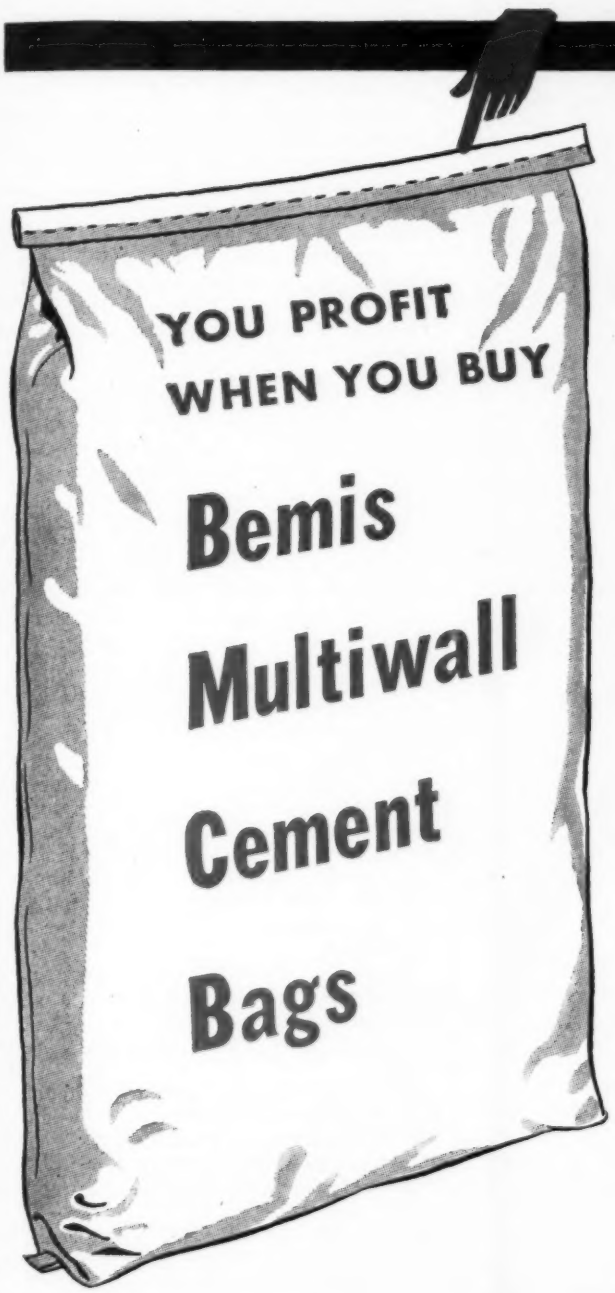
Following table of statistics covering the gypsum industry, Mineral Market Report No. 1539, comes from the Bureau of Mines' Mineral Industry Survey.

SALIENT STATISTICS OF THE GYPSUM INDUSTRY IN THE UNITED STATES, 1943-46

	1943	1944	1945	1946
Active establishments[1]	85	77	75	80
Crude gypsum:[2]				
Mined, short tons	3,877,541	3,761,234	3,811,723	5,629,398
Imported, short tons	231,323	342,462	508,762	1,457,140
Apparent supply, short tons	4,108,864	4,103,696	4,320,485	7,086,538
Calcined gypsum produced:[3]				
Short tons	2,557,730	2,363,143	2,485,090	4,169,662
Value	$14,751,587	$13,841,399	$14,473,566	$29,272,960
Gypsum products sold:[3]				
Uncalcined uses:				
Short tons	1,233,727	1,056,276	1,147,797	1,641,279
Value	$3,114,789	$2,953,564	$3,432,727	$5,105,789
Industrial uses:				
Short tons	163,500	200,473	157,796	207,178
Value	$2,258,981	$2,550,649	$2,326,363	$3,160,988
Building uses:				
Value	$53,722,762	$50,196,006	$54,389,504	$88,927,786
Total value	$59,096,532	$55,700,219	$60,148,594	$97,194,563
Gypsum and gypsum products—				
Imported for consumption	$304,154	$394,603	$548,697	$1,833,088
Exported	$283,720	$489,980	$1,502,668	$1,065,248

[1] Each mine, plant, or combination mine and plant is counted as 1 establishment.
[2] Excludes byproduct gypsum.
[3] Made from domestic, imported, and byproduct crude gypsum.

4 Good Reasons Why...



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2. Six strategically located Bemis Multiwall Plants and 27 sales offices assure you of good service wherever you are located.

3. Bemis Multiwall Specialists are always at your service—ready to help you solve your packaging problems.

4. Bemis is one of the oldest and largest makers of multiwall cement bags, with long experience in serving the cement industry.

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BEMIS BRO. BAG COMPANY

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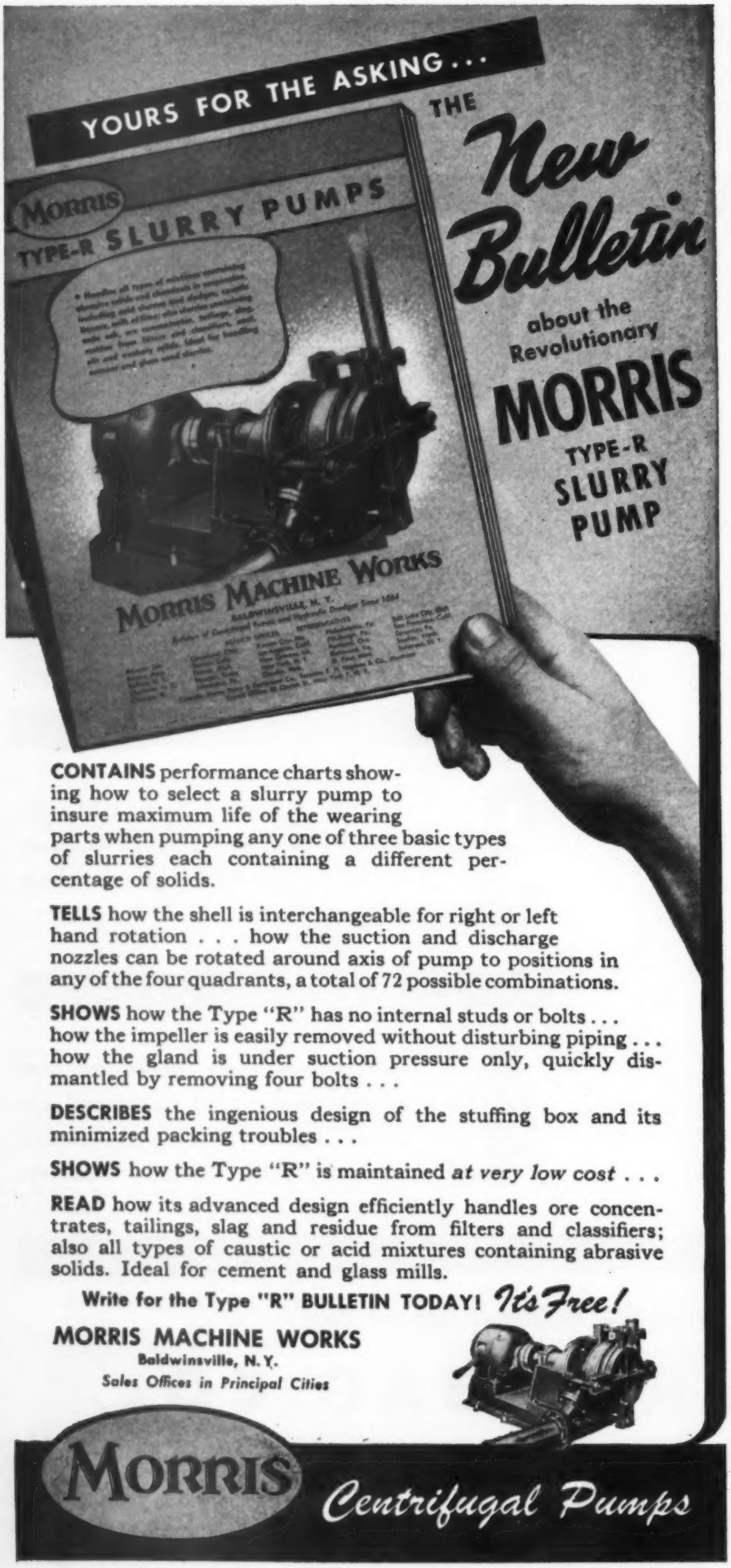

CONTAINS performance charts showing how to select a slurry pump to insure maximum life of the wearing parts when pumping any one of three basic types of slurries each containing a different percentage of solids.

TELLS how the shell is interchangeable for right or left hand rotation . . . how the suction and discharge nozzles can be rotated around axis of pump to positions in any of the four quadrants, a total of 72 possible combinations.

SHOWS how the Type "R" has no internal studs or bolts . . . how the impeller is easily removed without disturbing piping . . . how the gland is under suction pressure only, quickly dismantled by removing four bolts . . .

DESCRIBES the ingenious design of the stuffing box and its minimized packing troubles . . .

SHOWS how the Type "R" is maintained *at very low cost* . . .

READ how its advanced design efficiently handles ore concentrates, tailings, slag and residue from filters and classifiers; also all types of caustic or acid mixtures containing abrasive solids. Ideal for cement and glass mills.

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LETTERS TO THE EDITOR

Kiln Shell Heat Loss

Gentlemen:

The article "Kiln Shell Heat Loss Re-evaluated" by W. R. Bendy and H. Straight (ROCK PRODUCTS, May, 1947) would indicate that the effects of wind or the velocity of the surrounding air were a rather elusive factor in calculating heat losses from kilns, furnaces, etc.

Several years ago the writer had the opportunity to investigate the effects of air velocity on heat loss by convection and it is believed the readers of ROCK PRODUCTS might be interested in the findings.

Transfer of heat from one body to another at a lower temperature is accomplished by radiation and/or convection. A third method of transfer, however, is often of more importance; that is, "sweeping," whereby a body of gas is caused to move along the surface of a liquid or solid body such as the inside of a duct or exterior of a furnace wall. The heat exchange by conduction between a solid body and the particles of a gas, even though the gas be originally at rest, will produce a movement of the gas particles, the effect of which, from the standpoint of heat transfer is far more important than conduction alone. It is important, then, that this minimum gas velociy be determined and considered in heat loss computations.

Interest is centered upon two factors, namely sweeping and radiation. Heat transfer by radiation to and from exposed exterior surfaces has been ably discussed by Bendy and Straight in the above mentioned article and the writer will concern himself here with the effects of sweeping and air velocity on so-called convection losses.

Excluding radiation, the heat removed from the surface of a heated body may be expressed as:

$$Q = \Delta T(A)K_v$$

where:

Q = heat lost, kg. calorie per hour.
ΔT = temperature difference between the heated surface and the air, degrees centigrade.
A = area of heated surface, square meters.
K_v = coefficient of velocity, kg. calories per hour per square meter per degree centigrade.

Now the minimum value of K_v has been found to be 3.73 kg. calories per hour per square meter per degree centigrade at a minimum air velocity of .313 meters per second. Investigation also indicated that the value of K_v varied directly as the .786 power of the velocity.

Combining the above, we have:

$$K_v = 3.73\left(\frac{V}{.313}\right)^{.786}$$

where V is the air velocity (produced by natural draft, wind, blowers etc.) in meters per second. The total heat lost due to sweeping and/or convection is then:

$$Q = T(A)3.73\left(\frac{V}{.313}\right)^{.786}$$

Readers are advised that a value of V less than .313 meters per second should never be used. The value of $K_v = 3.73$ is dependent upon the condition of the surface rather than the material and while the value was determined by experimenting with clean cast iron and steel surfaces, it can be applied to any smooth, clean surface that is of the same mechanical condition as clean metal. The relationship appears to hold true for temperatures up to 400 degrees centigrade and for air velocities as high as 23 meters per second (approximately 50 m.p.m.).

Yours very truly,
G. F. HUBING
G. F. Hubing & Co.
Wyoming, Ohio

Ready Mix for Foundations

Gentlemen:

We have been reading your various articles about ready mixed concrete, etc. I would say that when we can get ready mixed concrete we like to use it for foundations, as there is a good volume of concrete there and it works all right. For the shaft of chimneys, it hasn't been practical to use it much, because the amount of material used each day in a chimney is so comparatively small and it has to be hoisted in small quantities so that the pre-mix people don't like to supply it because it ties up their equipment too long. Another thing, our men claim that they don't like to use pre-mix concrete in a shaft of a chimney because it is mixed too thick, and they don't need to control the outlet if it is thinner. It isn't thin enough for this work of building thin walls, such as the shaft of a chimney. I don't know whether this could be improved any by the pre-mix people or not.

Yours truly,
BERNARD P. WEBBER,
Vice-president
Weber Chimney Co.
Chicago, Ill.

Nonmetallic Mineral Map

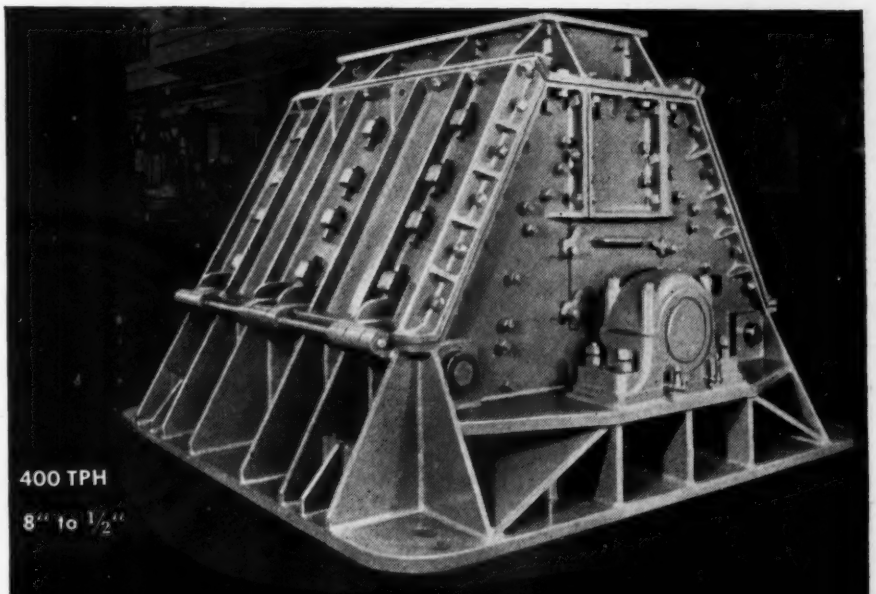
MISSOURI BASIN STUDIES No. 10, a map in color of Colorado showing locations of nonmetallic mineral deposits and of stone suitable for construction materials has been published by the Department of Interior, Geological Survey. These maps may be purchased for 80 cents; remit to Director, Geological Survey, Washington 25, D. C.

State Building Stone Survey Cancelled

OHIO state legislature, in trimming budgets, cancelled six surveys of a geologic nature. Among those cancelled was a proposed study of Ohio building stone (the latest such survey in Ohio is dated 1915).

Wool Bat Production

OHIO ROCK WOOL CO. has started production of rock wool in its New Lexington, Ohio, plant. The concern plans to produce rock wool bats soon and an additional building is now being completed for manufacture of this product.



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Fluorspar News Notes

SENATOR ZINC-LEAD-FLUORSPAR mine near Princeton, Ky., has recently started installation of a Sink and Float plant, with work being overseen by Mineral Flotation Corp. The mining company also has a fluorspar property under lease in Caldwell County, Ky., and operates a flotation mill at Marion, Ky.

Crystal Fluorspar Co. has found a 3-ft. vein of lead-fluorspar ore after crosscutting 200-ft. from the new Jefferson shaft, 6 miles northwest of Rosiclare, Ill. First samples of 500 tons tested at 75 per cent fluorspar, 10 per cent lead and 0.30 per cent silica.

FLUORSPAR DIVISION, Aluminum Ore Co., Rosiclare, Ill., has completed a $54,000 change building. In addition to complete change rooms for employes, the brick, steel and concrete structure includes a large auditorium.

BONANZA FLUORSPAR mine near Lola, Ky., has been leased by L. F. Hearne from Paul Cullum, Frankfort, Ind. Mr. Hearne formerly owned and operated the Eagle Fluorspar Co., which he sold to Aluminum Ore Co., together with the Babb, Watson and Cullen mines.

DELHI FLUORSPAR CORP. is sinking a new shaft at the Hickory Cane mine, 3 miles from Marion, Ky. The Hickory Cane mine was leased recently from Spartan Minerals, after Delhi Corp. had sold its Delhi-Babb fluorspar mine to Ozark-Mahoning Co. The new shaft is located on the "Big Four" fault and will produce fluorspar and zinc.

KENTUCKY FLUORSPAR CO., Marion, Ky., has resumed operation of the Bill Wright fluorspar mine near Lola, Ky. The company has held the property under lease for 10 years, operating it intermittently. Kentucky Flourspar has purchased a Western-Knapp Heavy-Media separation plant, according to R. N. Frazer, president. Early installation at the Marion property is planned.

ALCO LEAD CORP., Evansville, Ind., recently purchased the Corod plant at Marion, Ky., from the Government. The plant was constructed during the war for differential flotation of zinc, lead and fluorspar. Completed in 1943, the plant cost $252,000 to construct. Alco Corp. is considering removing the machinery either entirely to its lead mine in Hardin County, Ill., or removing part to the Illinois mine and part to its Princeton, Ky., (Senator) mine.

Correction

PLASTILUBE, the new plasticizing and waterproofing admixture for concrete, was erroneously credited to Union Oil Co. of Calif. in the May issue. The inventor of this additive, E. L. Moore, manufactures it under his own name at 1931 Oakwood St., Pasadena, Calif.

New Incorporations

Vine Street Quarry, Inc., Ottumwa, Iowa, has filed articles of incorporation listing a capital stock of $10,000. Corporation officers are: Harry E. Hansel, president; Roy Monohon, vice-president; and Jack W. Lytton, secretary and treasurer.

Syracuse Sand & Gravel Co., Syracuse, Kan., has been organized by Frank Morrell and L. L. Daniels to provide graded sand and gravel for construction work.

Duro-Stone of Florida, Inc., Orlando, Fla., filed articles of incorporation, listing 100 shares of no par value stock. Principals are W. H. and L. M. Blackwell, and W. H. and C. J. Reunbeck.

Mathis-Aikens Corporation, Macon, Ga., filed articles of incorporation with stock listed at $10,000. Activities are to be manufacture of concrete block, drain tile, brick, concrete pipe and ready mixed concrete. Principals are H. G. and A. Tinker and J. E. Williams.

Wichita Sand and Gravel Co., Wichita Falls, Texas, has filed articles of incorporation listing $50,000 as capital stock and Frank Burch, Jack D. Foley, and J. I. Staley as incorporators. A 50-year charter is sought.

D. J. Carter Sand & Gravel Co., Stamford, Conn., has been incorporated. Capital, 1000 shares, par value $100. Amount paid in property, $100,000. Officers: Daniel J. Carten, president-treasurer; Daniel C. Carten, vice-president; Ethel C. Armstrong, secretary-assistant treasurer; Edward J. Carten, assistant secretary. Directors: Officers and Ellen Carten.

Rockingham Ready Mix Concrete Co., Inc., Leaksville, N. C., has been organized to sell building material. Authorized capital stock, $50,000; subscribed stock, $8000 by J. B. Sapp, Jr., Robert L. Smith and Ralph L. Durham, all of Leaksville.

Western Gypsum Co., Salt Lake City, Utah, headed by Sid H. Eliason, Sigurd, Utah, plans mining, quarrying, manufacturing and dealing in gypsum and gypsum products. Central offices of the $40,000 firm will be in Continental Bank Bldg., Salt Lake City.

Winchendon Block & Plating Corp., Winchendon, Mass., has been incorporated to deal in cement and concrete products, bricks, etc., listing 500 common shares at no par value. Wilfred R. Rushia is president; Risiere J. Giardini, treasurer; and Lazarus A. Aaronson, clerk.

Trinity Portland Cement Co., Wilmington, Del., has received a charter to deal in mineral products, with a capital of $1000. Principal office is the Corporation Trust Co.

Western Lime Co., LaConner, Wash., has filed articles of incorporation for $50,000. John Koetje of LaConner is head of the firm.

Live Wire!

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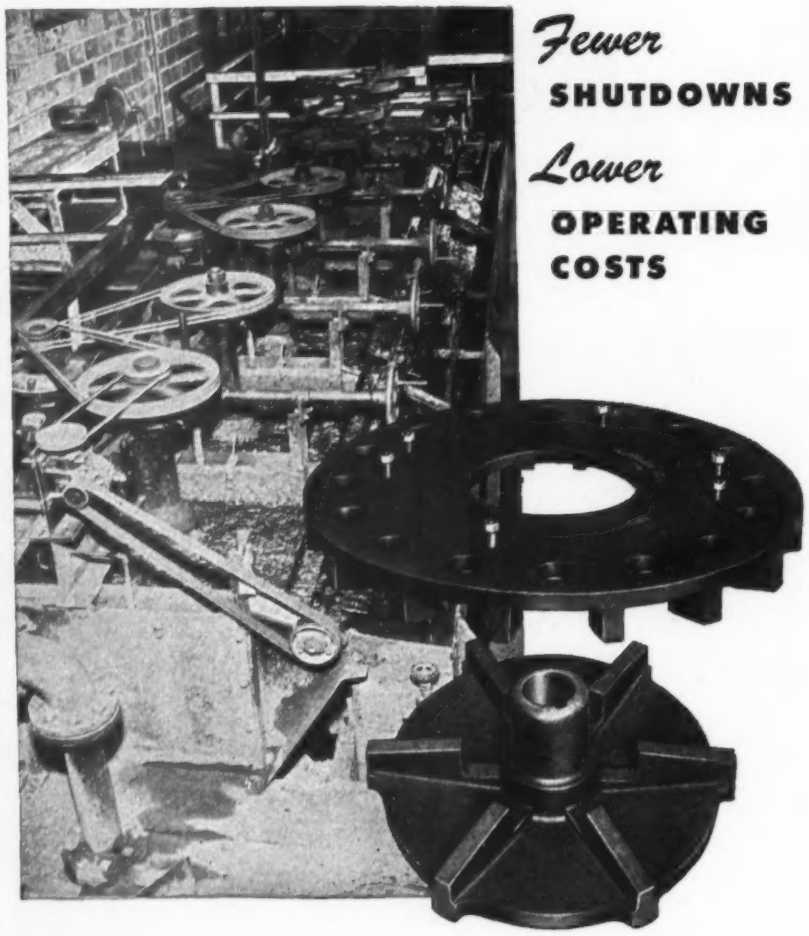

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FINANCIAL

RECENT DIVIDENDS

Arundel Corp.	$ .25	July	1
Canada Cement p.	$ .32½	September	20
Colonial Sand & Stone Co.	.10	July	22
Coronet Phosphate Co.	1.50	June	30
Missouri Portland Cement Co.	.50	June	25
Santa Cruz Portland Cement Co.	.50	June	16
Standard Silica Corp.	.12½	September	15
Pacific Portland Cement pf.	1.62½	August	31
Warner Co.	.15	July	15

•

LONE STAR CEMENT CORP., New York, N. Y., has issued the following statement of income for the six months period ended June 30, 1947:

	1947	1946
Sales	$20,923,325	$18,725,897
Cost of sales	13,065,214	12,030,010
Selling, etc., expense	1,940,705	1,708,773
Deprec. and deplet...	924,281	908,213
Operating profit	4,993,125	4,078,901
Other income	248,114	318,835
Total income	5,241,239	4,397,736
Fed. income tax	1,273,488	1,039,545
Other taxes	929,826	696,897
[1] Misc. charges	371,294	487,917
Net profit	2,666,631	2,173,377

[1] Includes provisions for doubtful account and contingencies.

•

CONSOLIDATED CEMENT CORP., Chicago, Ill., had a net profit of $242,952, or $2.43 a share, for the year ended December 31, 1946, as compared with $2962 for the year ended December 31, 1945. Net sales were $4,089,288 for the year ended December 31, 1945. Net sales were $4,089,288 for the 12 months in 1946 as against $2,406,378 for the same period in 1945. The company's program for repairs, replacement and improvement projects has been carried on during 1946 as conditions permitted and will be continued in 1947. Total charges to fixed asset account for the year amounted to $248,470.61.

•

PENNSYLVANIA-DIXIE CEMENT CORP., New York, N. Y., reported a net income of $7710 for the three months ended March 31, 1947, as compared with a loss of $218,224 for the same period in 1946. Net sales amounted to $2,063,133 for the first quarter of 1947 as against $1,526,976 for the first quarter of 1946. Net income for the year ended December 31, 1946, showed $1,199,468 as against a loss of $751,827 for the year ended December 31, 1945. Net sales amounted to $11,910,240 for the 12 months of 1946 and $5,020,816 for the 12 months of 1945.

•

NORTH MILWAUKEE LIME & CEMENT Co., Granville, Wis., has increased its stock from 500 shares par value $100 to 2500 shares par value $100.

•

YOSEMITE PORTLAND CEMENT CO., Merced, Calif., in liquidation since sale of its principal properties in 1944, expects to be able to pay an additional dividend of slightly over 83¢ a share to holders of 4 per cent non-cumulative preferred, provided the Internal Revenue Bureau approves a tax carryback settlement of $114,142 in favor of the company, agreed to by the Treasury Department.

NAZERETH CEMENT CO., Nazareth, Penn., reported a net profit of $236,146 for the 12 months period ended June 30, 1947, as against $121,689 for the same period last year.

•

LONGHORN PORTLAND CEMENT CO., San Antonio, Texas, showed a net profit of $301,868, or $1.20 a common share for the first six months of 1947 as compared with $159,633, or $0.59 a share for the same period in 1946.

•

GENERAL PORTLAND CEMENT CO., Chicago, Ill., has presented the following statement of income for the six months period ended June 30:

	1947	1946
Net sales	$6,447,500	$5,629,700
Cost and expense	4,666,300	4,280,800
Operating profit	1,781,200	1,348,900
Other income	*dr* 63,700	27,000
Total income	1,717,500	1,375,900
Fed. income tax	659,000	523,000
Net profit	1,058,500	852,900
Earned per share	$1.06	$0.85

Based on 999,998 shares.

Note: Earnings for 6 months ended June 30, 1947 include aggregate of results of operations of predecessor companies for period from Jan. 1, to Feb. 19, 1947, plus results of operations of General Portland Cement Co. from Feb. 19, to June 30, 1947; and for corresponding six months of 1946, the aggregate of results of operations of predecessor companies for that period.

•

LOCK JOINT PIPE CO., Ampere, N. J., had a net income of $488,302 for the year ended December 31, 1946 as against a profit of $1858 for 1945. Gross sales in 1946 were $5,879,178 as compared with $3,323,182 in 1945.

•

SANTA CRUZ PORTLAND CEMENT CO., San Francisco, Calif., showed a net profit of $304,939 for the year ended December 31, 1946. Net sales in 1946 were $2,109,011.

•

CELOTEX CORPORATION, Chicago, Ill., stockholders on February 18 approved a plan adopted by directors on September 18, 1946, under which 50,000 common shares were sold to executives and key employes at $24 a share.

•

NORTH AMERICAN CEMENT CORP., New York, N. Y., has presented the following income account for the years ended December 31:

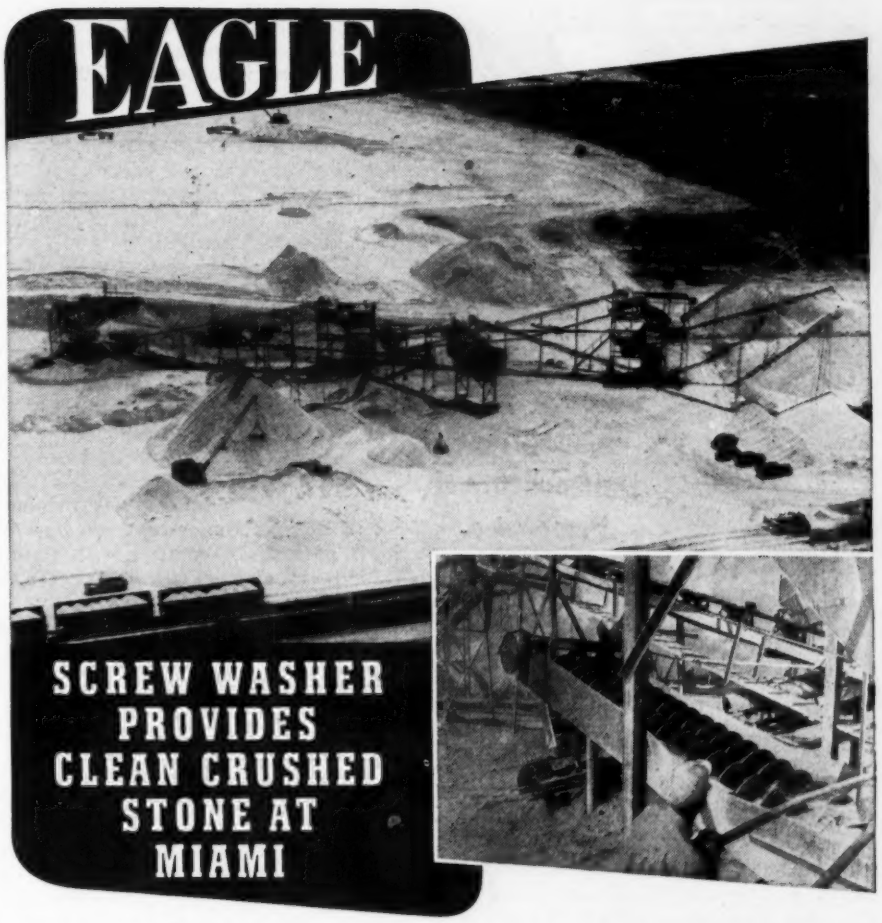
	1946	1945
Net sales	$5,323,748	$3,426,075
Cost of sales	3,870,499	2,541,463
Selling, exp., etc.	651,125	552,923
[1] Non-op. plt. exp.	106,660	121,670
Deprec. & deplet.	292,300	275,924
Oper. profit	403,164	*d* 65,906
Misc. income, net	23,575	18,159
Total income	426,739	*d* 47,747
Interest, etc.	107,377	114,505
Net income	319,362	*d* 162,250
Oper. deficit, 1-1	2,511,495	2,356,457
Credits	105,578	26,097
Pr. yr. adjusts.		18,884
Oper. def., 12-31	2,086,554	2,511,495
Times chg. earn.	3.97	

[1] Expense of non-operating plant, including depreciation of: 1946, $45,000; 1945, $71,964.

Net profit for the year ended March 31, 1947, after depreciation, depletion, taxes and interest but before profit on bonds purchased, is $359,054 as contrasted with a net loss of $88,143 for the year ended March 31, 1946.

•

PENNSYLVANIA-DIXIE CEMENT CORP. has announced that the Portland Point, N. Y., plant has been closed down after operating at a loss for the past 15 years.



Pictured is the modern day plant of Miami Crushed Stone Co., which was put in operation in 1946 on a 380 acre tract of oolitic limerock near Miami, Florida. The output of this plant is commonly 30 to 35 carloads of aggregates daily.

As the most advanced equipment is installed at this plant, there is naturally an Eagle Washer-Classifier-Dewaterer present—as shown above. This 24 inch by 20 foot Eagle Double Screw Washer removes all lime dust and silt from the crushed material.

As in numerous other localities, the Eagle unit helps to assure the Miami area properly washed and above-specification material for better roads, better concrete, better foundations and better airports.

Operating characteristics of Eagle Screw and Log Washers include: more thorough washing; controlled, concentrated water volume; high continuous capacity; longer screw life; no dead zones in tank; lower power requirements; and a better product at lower cost.

Write for Bulletin No. 46 on Eagle Sand, Gravel and Ore Equipment.

75th Anniversary 1872-1947 Progress...Service

Sand and Gravel Equipment

"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS

EAGLE IRON WORKS

137 Holcomb Ave. • Des Moines, Iowa

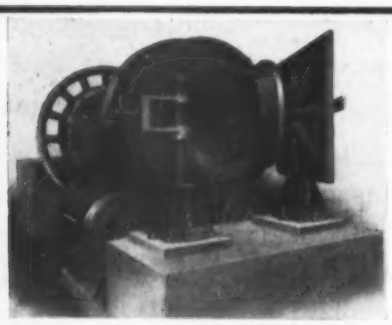
Made of Acid Open Hearth Steel Wire

Round Strand
Flattened Strand
Preformed
Steel Clad
Non-Rotating

The Service Record of this wire rope continues to make and hold friends.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
Established 1857
5909 Kennerly Avenue St. Louis, Mo.
New York — Chicago — Denver
San Francisco — Portland — Seattle

MARCY
open-end
Rod Mills



The Marcy Open-End Rod Mill is ideally suited for grinding unwanted aggregate sizes to concrete sand. Mills are made with standard open-end, as shown, or with center discharge. Rapid pulp discharge prevents over-grinding. One pass thru the mill gives a uniform product in the 8 to 20 mesh range. Power requirements are reasonable and costs for grinding media are low. Sizes available from 2'x4' to 9'6"x12".

Submit your problems.

THE MINE & SMELTER SUPPLY COMPANY
Denver Salt Lake City El Paso
1775 Broadway, New York

CALIFORNIA PORTLAND CEMENT CORP., Los Angeles, Calif., has reported a net income of $2,071,071, or $41.42 per share, for the 12 months ended April 30, 1947. The company recently placed on sale 6,433 shares ($100 par) capital stock at $350 per share, part of 50,000 shares outstanding. The offering did not represent company financing.

•

LONGHORN PORTLAND CEMENT CO., San Antonio, Texas, reported net income of $508,158 for the year ended December 31, 1946, as compared with $187,403 for the year ended December 31, 1945.

•

SUPERIOR PORTLAND CEMENT, INC., Seattle Wash. had a net income of $215,258 for the year ended December 31, 1946, as compared with $213,808 for the year ended December 31, 1945.

•

ALBERENE STONE CORP. OF VA., New York, N. Y., reports a net income of $4657 for the three months ended March 31, 1947, as compared with $803,410 for the year ended December 31, 1946.

•

CONSOLIDATED CEMENT CORP., Chicago, Ill., had a net profit of $32,572 for the six months period ended June 30, 1947, as compared with $55,167 in the first half of 1946. Net sales amounted to $1,205,586 for the first half of 1947 as against $1,326,611 for the same period in 1946.

•

COLONIAL SAND & STONE CO., INC., New York, N. Y., had a net profit in excess of $400,000 for the six months period ended June 30, 1947. This compares with a profit of $150,719 for the similar period in 1946.

•

NATIONAL GYPSUM CO., Buffalo, N. Y., reported a net profit of $2,531,446 for the six months ended June 30, 1947, as compared with $1,727,218 for the similar period of 1946. Net sales for the first half of 1947 were $23,998,469, as against $16,057,705 for the first half of 1946.

•

GENERAL PORTLAND CEMENT CO., Chicago, Ill., on June 20, 1947 registered with the SEC 42,480⅓ additional $1 par common shares issuable at $12 per share upon exercise of stock purchase warrants issued under a consolidation plan which became effective February 19, 1947. Terms of warrants provide for their exercise during a 3-year period commencing 150 days after effective date of the consolidation. There is no underwriting, and proceeds are to be used for general corporate purposes.

•

ROCKLAND-ROCKPORT LIME CO., INC., Rockland, Me., showed a net profit of $9,964 for the year ended December 31, 1946, as against $565 for the same period in 1945. Net sales totaled $463,528 for 1946.

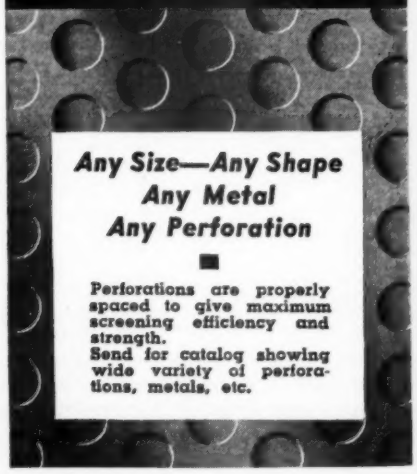
New FARREL-BACON CRUSHER has many advantages

Design features of this 36 x 30 E stone crusher include: (1) Meehanite frame, sectionalized when necessary; (2) removable water cooled bearings; (3) improved design of swing jaw bearing; (4) force-feed oil lubrication, or circulating system if desired; (5) split flywheels; (6) flat or V-belt drive.

Write for further details or engineering help. 8A-1

FARREL-BACON
ANSONIA, CONNECTICUT

PERFORATED METAL SCREENS



Any Size—Any Shape
Any Metal
Any Perforation

Perforations are properly spaced to give maximum screening efficiency and strength.
Send for catalog showing wide variety of perforations, metals, etc.

The Harrington & King Perforating Co.
5650 FILLMORE ST., CHICAGO 44, ILLINOIS
114 LIBERTY ST., NEW YORK 6, N. Y.

Manufacturers' News

McNally Pittsburg Foundries, Inc., Pittsburg, Kans., has appointed Desmond Gamble as sales representative for all territory in the Western half of the country. He was formerly office manager.

Easton Car & Construction Co., Easton, Penn., has appointed George D. Fraunfelder as director of engineering and research. He has been with Easton as a design engineer since 1926.

Stearns Mfg. Co., Inc., Adrian, Mich., is opening an Eastern office to serve customers in eastern New York, northern New Jersey and all of the New England States. Theodore H. Merriam, director of operations since 1944, has been named eastern manager, to replace C. J. Rahn of the C. J. Rahn Co., Inc., who has retired due to ill health. For the time being, the office will be located at the Rahn Co. address in Newark, N. J., but will be moved to New York at an early date. Mr. Merriam was formerly a concrete products engineer for the Portland Cement Association in the Michigan and Chicago offices.

Theodore H. Merriam

The Baker-Raulang Co., Cleveland, Ohio, is erecting an addition to its No. 2 factory at 8200 Baker Ave., Cleveland. This will be followed by the erection of five additional bays for heavy machine operations.

Sterling Engine Co., Buffalo, N. Y., announces the election of James B. Porteus, Bronxville, N. Y., as a member of the board of directors and president of the company, succeeding Addison F. Vars, who has resigned, but will serve as chairman of the board. George M. Ebert will continue as executive vice-president and comptroller. Mr. Porteus was formerly with the Westinghouse Electric International Co., in charge of distribution in Brazil and subsequently in northern Latin America. Sterling Engine Co. is one of the country's leading manufacturers of Diesel and gasoline engines for both marine and industrial use.

James B. Porteus

New Holland Mfg. Co., Mountville, Penn., has appointed J. V. McKee as Southwestern district sales manager for the territory covering the States of Texas, New Mexico, Arkansas, Oklahoma, western Tennessee, Mississippi and Louisiana.

HEAT RESISTANT

X-RAY CONTROLLED

For fewer kiln shut downs install **THERMALLOY FEED PIPES**

THERMALLOY feed pipes have proven themselves in hundreds of calcining installations; they resist abrasion, they do not scale excessively, they are economical.

Uninterrupted kiln operation depends on feed pipes no less than other alloy parts. There is a THERMALLOY grade for any heat and corrosion resistant application.

OTHER THERMALLOY CALCINING APPLICATIONS

NOSE RINGS

FEED ENDS

DAMPERS

DRAG CHAIN

RECOUPERATOR PLATES

COOLER GRATES

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION

ELYRIA, OHIO.

Maximum returns on big dragline investments are dependent upon getting the best bucket available and using it correctly.

Page Automatics dig right in at the first pull on the load line because they always land in digging position and hold it even with all lines slack. Instant penetration at any depth, 20 feet to 100 feet — or more, assures full loads in any kind of digging in less than two bucket lengths. Perfect balance of the bucket helps the digging action. Teeth cannot be lifted off the ground by the pull line. For details send for Bulletin 1537.

New Page Reversible Center Shank Tooth Points secured by a hook bolt will stay absolutely tight.

PAGE Automatic

DRAGLINE BUCKETS and WALKING DRAGLINES

PAGE ENGINEERING CO., CHICAGO 38, ILLINOIS

PULVERIZERS

Hundreds of Installations . . Use Bradley Pulverizers

for the reduction of

AGRICULTURAL LIMESTONE
Cement Materials and all
Dry, Non-Metallic Minerals

CAPACITIES: 1 TO 50 TONS PER HOUR
FINENESSES: 20 TO 350 MESH

BRADLEY PULVERIZER CO.

ALLENTOWN, PENNA.

Chain Belt Co., Milwaukee, Wis., announces that David B. Hill has joined the Atlanta office as district field engineer. Orval Lorenz, formerly with the Atlanta office as district field engineer, has been transferred to the Dallas office, and Charles Stanton has moved from Detroit to Philadelphia.

The Jaeger-Lembo Machine Corp., Flushing, L. I., N. Y., announces that Joseph C. Lembo, president of the company, captured the low net prize recently in the annual golf tournament of the General Contractors Association held at the North Hills Golf Club, Douglaston.

Gardner - Denver Co., Quincy, Ill., has sold its governor business to the Wiebmer Machine Shop of Quincy, Ill., and will concentrate on its expanding business in rock drills, air compressors, pumps and other allied products.

Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J., has again received the Award of Excellence for its business paper advertising campaign from the National Advertising Agency Network.

Davey Compressor Co., Kent, Ohio, has appointed Fly & Harwood, Inc., Memphis, Tenn., as distributors.

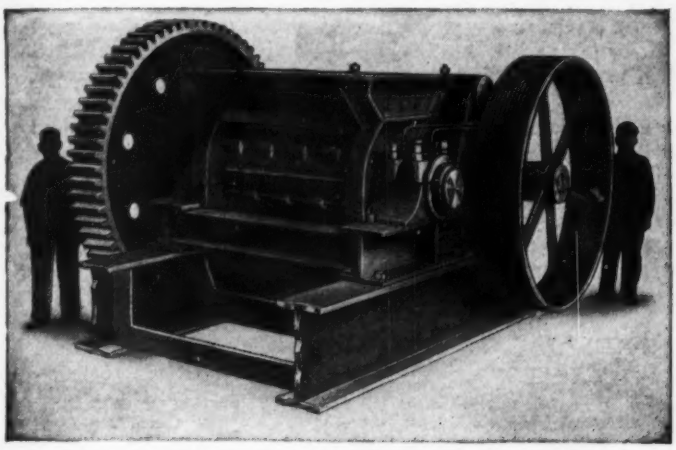
Quaker Rubber Corp., Philadelphia, Penn., announces the appointment of A. Harold Smith as New York district sales manager, and P. H. Potts as New York branch manager, with headquarters in New York City.

Eagle Iron Works, Des Moines, Iowa, is celebrating its 75th anniversary of progressive development under the leadership of three generations of Aulmanns in serving the mining, clay products and sand and gravel industries. Lawrence Aulmann and his brother, George W. Aulmann, father of the present president and treasurer, founded the company in 1870. Present officials are Theodore Aulmann, president and treasurer; Ralph L. Aulmann, secretary; C. B. Laird, sales manager, and H. L. White, chief engineer. Al Hartman, plant superintendent, has completed nearly 50 years of service, having joined the company in 1898.

Theodore Aulmann

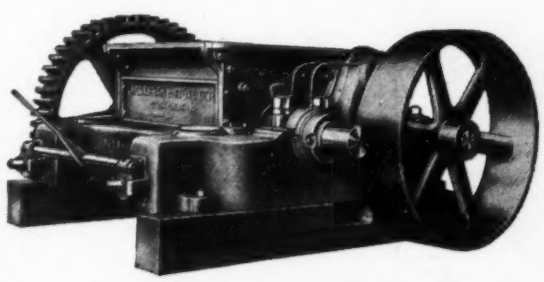
Nordberg Mfg. Co., Milwaukee, Wis., has announced the appointment of Roland W. Bayerlein, D. A. Cheyette, Henry H. Talboys and R. R. Shafter as vice-presidents of the company. Mr. Bayerlein will have charge of sales and engineering of the heavy machinery division; Mr. Cheyette will serve as vice-president in charge of the crusher division; Mr. Talboys will be in charge of the railway equipment division, and Mr. Shafter will have charge of the process machinery division.

A DOZEN GOOD REASONS
FOR CHOOSING
McLANAHAN
SINGLE ROLL
ROCK CRUSHERS



THE ROCKMASTER AUTOMATIC STEELSTRUT TOGGLE PRIMARY CRUSHER— REMARKABLE POWER AT LOW COST

1. All Steel Constructed 2. Cast Steel Gears 3. Automatic Steelstrut Toggle for Tramp Iron Protection 4. Chilled Alloy Iron or Steel, Interchangeable and Reversible Crushing Plate Liners 5. Hard Surfaced Steel Segment Rolls Easily Replaced Without Dismantling Machine 6. Takes Choke Feed. 7. Dry, Muddy, Wet or Frozen Material Never Packs 8. Lowest Proportion of Flats and Dust Produced 9. Slowest Speed of Moving Crushing Elements 10. Greatest Crushing *Range* With Opening Easily Adjustable 11. Takes Large Primary Sizes 12. Low First Cost—Low Power Cost—Minimum Repair and Upkeep Costs.



THE STEELSTRUT SLEDGE-WEDGE CRUSHER HIGHEST TON-PER-DOLLAR VALUE!

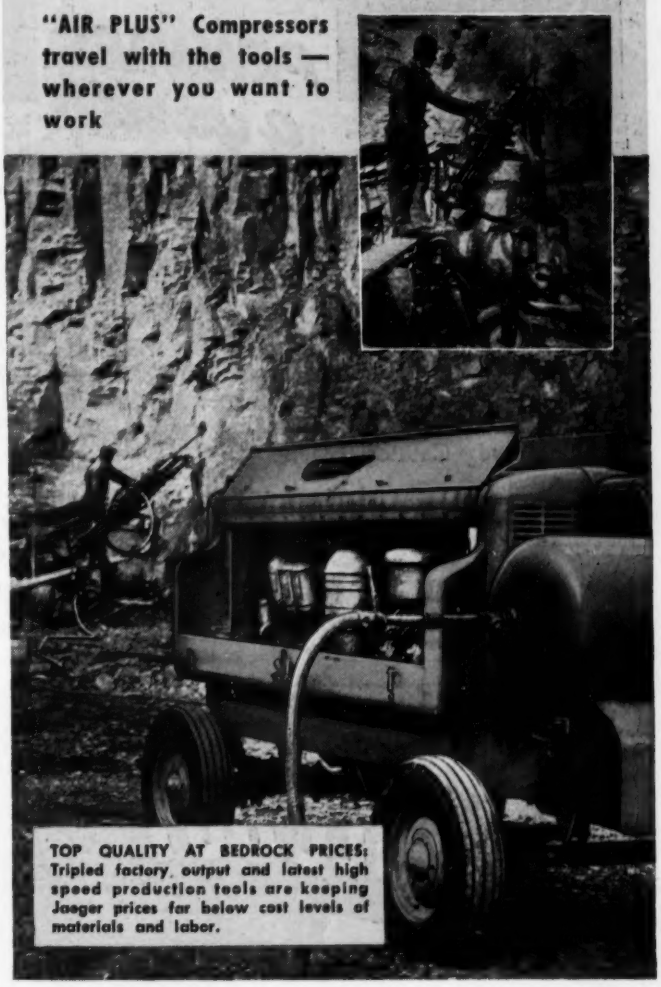
Modernize your present plant with modern, dependable, low cost McLanahan equipment. Write for descriptive Bulletins today.

McLANAHAN & STONE CORPORATION
Pit, Mine and Quarry Equipment Headquarters
Since 1835
HOLLIDAYSBURG, PENNSYLVANIA

AIR PLUS JAEGER COMPRESSOR

modern Air Power moves on wheels...

"AIR PLUS" Compressors travel with the tools — wherever you want to work



TOP QUALITY AT BEDROCK PRICES: Tripled factory output and latest high speed production tools are keeping Jaeger prices far below cost levels of materials and labor.

The modern portable compressor, fully developed by Jaeger, has proved a flexible and efficient source of power for quarry work. Self-contained units, able to travel wherever a truck can go, they move with the job and work only as needed. Precision built and powered with heavy duty gasoline or diesel engines of the latest type, they require far less fuel and upkeep than old-type portables, deliver cooler, drier air, will provide up to 600 cu. ft. of air per minute for 8 hours of steady drilling, every working day.

Send for name of your nearest Jaeger air station and Catalog JC-5, the up-to-date buyer's guide.

THE JAEGER MACHINE CO.
Main Office and Factory — Columbus 16, Ohio

REGIONAL OFFICES

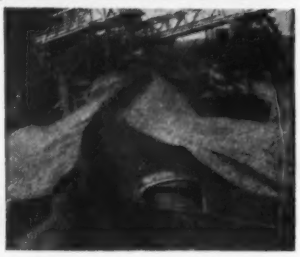
8 E. 48th St. New York 17, N. Y. 226 N. La Salle St. Chicago 1, Ill. 235-38 Martin Bldg. Birmingham 1, Ala.

AIR COMPRESSORS, MIXERS, PUMPS, HOISTS, PAVING MACHINERY, TRUCK MIXERS — DISTRIBUTORS IN 128 CITIES

DIG-HAUL-DUMP

Cement mill uses Sauerman Cableway to move clay from pit to car-loading hopper.

for a FEW PENNIES a yard!

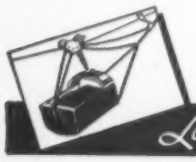


Sauerman Scraper stockpiles surplus output of gravel plant; later reclaims to cars.

How to Move Materials on Long Hauls

In moving material from pits, ponds, banks and stockpiles it pays to use a machine that combines digging, hauling and dumping in a continuous automatic cycle controlled by one operator.

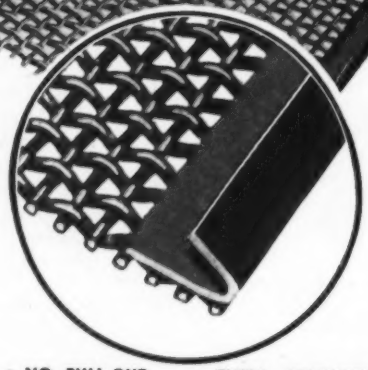
Use a Sauerman Power Scraper if the material lies in a dry pit, bank or stockpile. Use a Sauerman Slackline Cableway if the material is under water. With either machine you are assured rapid and dependable handling at low cost. For complete information write for Scraper Catalog 19-A and Cableway Catalog 19-C.



SAUERMAN BROS., INC.
530 S. Clinton St., Chicago 7

Long Range Material Handling Machines

NO SAG NO PULL OUT



With Cleveland Wire Screen Section Assemblies

• Increase your profits and stop tonnage losses with the specially prepared, reinforced screen sections for vibrators. This standard type of edge is available in five different styles for electrical and mechanical vibrating machines.

Let our wire screen specialist show you how you can adapt these screen section assemblies to increase your profits.

There is a CLEVELAND Wire Screen for every purpose.

- NO PULL-OUT
- NO SAG
- LONGER SCREEN LIFE
- EXTRA STRENGTH
- EASY TO CHANGE
- DRUM-TIGHT TENSION

For detailed information on Cleveland Screen Section Assemblies write today for BULLETIN No. 6.

THE CLEVELAND WIRE CLOTH & MFG. CO.
3574 E. 78 STREET CLEVELAND 5, OHIO

Mobilift Corp., Portland, Ore., formerly the General Equipment Co., has opened an office in San Francisco, Calif., with R. M. Lewis as manager. T. H. Skeel has been made manager of the Atlanta, Ga., office to replace E. J. Sell.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed Fred C. Bond as technical director of the basic industries department, and Will Mitchell, Jr., as director of the department's research laboratory. Bruce H. Irwin has been named assistant laboratory director and director of training for the department.

Westinghouse Electric Corp., Pittsburgh, Penn., announces that James R. Weaver, works manager of the East Springfield works, has been appointed a director of the Wico Electric Co., West Springfield, Mass.

Associated Equipment Distributors, Washington, D. C., has decided to move the executive office from Washington to Chicago, Ill. Carol F. Winchester, executive secretary of A.E.D. for the past six and one-half years, has submitted his resignation effective September 30, and Frank G. Knight, assistant secretary, has been appointed to succeed him.

Harbison-Walker Refractories Co., Pittsburgh, Penn., has appointed W. F. Rochow to the position of assistant to the president, which position will place him in charge of the research and sales technical departments.

Cataphote Corp., Toledo, Ohio, distributors of Darex AEA, air-entraining agent, in Ohio, Michigan, Indiana and Kentucky, has appointed John Williamson as manager of the cement products division.

Pittsburgh Plate Glass Co., Pittsburgh, Penn., has appointed W. I. Galliher as executive sales manager of the Columbia Chemical Division and the Southern Alkali Corp., a subsidiary, with headquarters in Pittsburgh. Mr. Galliher has been executive sales manager of the Columbia Chemical Division since 1943.

The Kent Machine Co., Cuyahoga Falls, Ohio, has announced the appointment of Herbert T. Young as president of the company, succeeding A. B. Babbitt, who has retired. Mr. Young started with the firm in 1926 as a shop employe and subsequently was moved into the engineering department as a draftsman, becoming production engineer and then assistant to the president.

Hyster Co., Portland, Ore., announces that Paul Rhodes, who has been with the company since September, 1945, working in coordinating and expediting of materials in the Chicago office, has been appointed purchasing agent, with headquarters at Portland.

Ford Motor Co., Dearborn, Mich., announces that H. Y. Ingram, manager of the Memphis, Tenn., office has resigned to become a partner in a Ford dealership at Greensboro, N. C., and that T. J. O'Neil, sales district manager at Indianapolis, will succeed him as manager of the Memphis office.

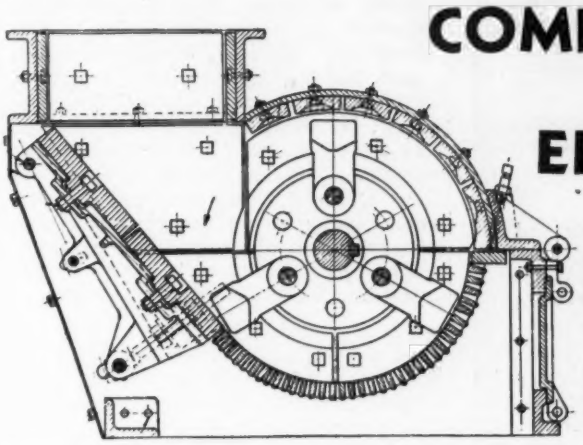
Goodyear Tire & Rubber Co., Akron, Ohio, has named Robert R. Boyle as division superintendent of the tire plant in Buitenzorg, Java. Larry H. Coffin, plant manager of the tire, textile and mechanical goods operations in Sao Paulo, Brazil, has been appointed assistant to George K. Hinshaw, vice-president and production manager of foreign operations, Akron, Ohio. R. E. Pauley, district manager at Pittsburgh, has been made sales manager of the molded goods plant at St. Mary's, Ohio, succeeding Samuel DuPree who has been made an assistant manager of mechanical goods division, with headquarters in Akron. Robert B. Warren, eastern railroad sales manager in New York, succeeds Mr. Pauley as district manager at Pittsburgh. Howard T. Martin has been named district manager of mechanical goods sales at Dallas, Texas, succeeding O. A. Schilling, who was recently appointed eastern sales manager of mechanical goods at Akron.

LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, announces that Roy E. Choate, president, has been elected director of the Quad Cities-Iowa Post, Army Ordnance Association for the year beginning July 1, 1947. A sales and service conference which was attended by key sales personnel of the company and its Latin-American dealers was held at Caracas, Venezuela, the latter part of June. Present at the occasion were E. R. Galvin, S. L. Myers, G. E. Hall and Frank Belousek of LaPlant-Choate, and representatives of dealers from Panama, Puerto Rico, Brazil, Chile, Argentina, Peru, Columbia and Netherland West Indies.

International Harvester Co., Chicago, Ill., has appointed J. S. Turner as assistant manager at Wichita, Kans., motor truck branch. He was formerly retail manager at Little Rock, Ark. Farmall Works is planning an addition to its present manufacturing space. The company has also announced that it is readying nine of its International TD-9 crawler tractors for use in the various inundated areas of the Middle West, and that a field test run of the giant new TD-24 crawler tractor was made recently for the benefit of 75 professors of mechanical engineering from leading colleges in U. S. The demonstration was part of a program sponsored in connection with the "Conference of Teachers of Diesel Engineering" held in Chicago under the auspices of the Diesel Engine Manufacturers' Association.

Waukesha Motor Co., Waukesha, Wis., has appointed Charles E. Nelson, Jr., as assistant to the president, James E. DeLong. Mr. Nelson was recently elected a director and member of the executive committee of The Internal Combustion Engine Institute, replacing Mr. DeLong, a former president of the Institute. He is also a director of The Waukesha National Bank.

AMERICAN HAMMERMILLS
Engineered for
COMPACTNESS
and
EFFICIENCY



A B C

With the right CRUSHING ACTION to suit the job. (A) "BRUTE" for heavy duty, (B) "BROADHEAD" for medium, (C) "SPLITTER" for fine reduction.

Diagram illustrates the compactness of the American "30 Series" Crusher. Design incorporates simplicity and direct action for a high standard of efficiency. Note heavy adjustable front platen with accessible adjustment for size change and to compensate for wear; sectional construction for ease of dismantling — also the removable curved plate for accessibility to crushing chamber.

Send for New Bulletin "Better Stone Crushing."

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

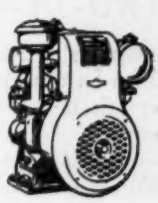
1245 MACKLIND AVE. ST. LOUIS 10, MO.

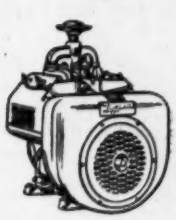
The
REAL MEASURE of ENGINE VALUE is "H. P. HOURS" of POWER SERVICE

It isn't the original H.P. rating of an engine that counts but rather, the number of *H.P. Hours* of power service it will deliver during its lifetime. This, in the final analysis, is the real measure of *engine value.*

Wisconsin Air-Cooled Engines deliver the most H.P. Hours because they are designed and built for rugged, heavy-duty service. For example: every Wisconsin Engine, from the smallest to the largest, runs on Timken tapered roller bearings at both ends of the crankshaft to take up end-thrust and provide the best protection against bearing failure . . . at the same time assuring a smooth-running engine. This is just one typical detail that stands back of "Most H.P. Hours" of on-the-job power service.

You can't go wrong if you specify "Wisconsin Air-Cooled Engines" to meet your power requirements, within a 2 to 30 hp. power range.





Wisconsin Engines are available in a complete range of types and sizes (all 4-cycle) from 2 to 30 hp.

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN
World's Largest Builders of Heavy Duty Air-Cooled Engines

Dependable steel products and unequalled steel service facilities . . . available for your steel-buying convenience at twelve conveniently located Ryerson plants. Because of great demand; all sizes are not always in stock; but we usually can suggest a reasonable alternate.

PRINCIPAL PRODUCTS

Bars • Structurals • Plates • Sheets • Tubing • Allegheny Stainless • Alloy Steel • Safety Floor Plate • Bolts • Rivets • Metal Working Tools & Machinery, etc.

JOSEPH T. RYERSON & SON, INC.

Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles

Cummins Engine Co., Inc., Columbus, Ind., has announced the election of R. E. Huthsteiner, vice-president and general manager, as a director of the company to succeed Hugh Th. Miller who died May 26. Edwin G. Crouch was elected secretary to succeed D. C. Bottorff, who died June 3, and Waldo M. Harrison has been named treasurer to succeed Mr. Bottorff. Mr. Harrison also will continue as controller. H. L. Knudsen has resigned as vice-president of engineering but will continue as a director, also serving as engineering consultant on problems of design and research. All other officers and directors will continue in their present capacities.

S. J. Coffey has been appointed manager of regions. He was formerly manager of Cummins Diesel Sales Corp. of Illinois. Byron A. Duling has been named manager of engine distribution with headquarters at Columbus. He will have charge of all engine distribution to dealers and manufacturers. Raymond Boll has been appointed assistant manager of the Cleveland region, and W. C. Phillips has been made assistant manager of the Southeastern region.

R. G. LeTourneau, Inc., Peoria, Ill., has been awarded a certificate of merit for outstanding achievement in the industrial advertising field by the National Industrial Advertisers Association, on one of its ads which appeared in ROCK PRODUCTS.

Frank G. Hough Co., Libertyville, Ill., has announced the appointment of Charles R. Boreham as parts and service manager. On June 30 the company was host to a group of Australian distributors who made a tour of a number of industrial plants and jobs in the Chicago area where Hough loaders and sweepers, etc., could be observed in operation, also to study the design and construction features of the various pieces of equipment.

Twin Disc Clutch Co., Racine, Wis., has announced the appointment of C. F. Mohrbacher as assistant sales manager of the Racine division. A. E. Young has been named district manager of the West Coast territory, including California; E. H. Bennett has been made district manager of the Eastern territory; W. L. Dixon will continue as consulting sales engineer of the Newark office; J. B. Jenkins has been appointed district manager of the Michigan territory; P. G. Tyrrell, assistant district manager of the new Los Angeles office; P. W. Wahler, assistant district manager at the Seattle factory branch; Wade A. Eskridge, assistant district manager of the Tulsa office; and H. A. Davis, manager of the Dallas office.

Caterpillar Tractor Co., Peoria, Ill., anounces that Wendell J. Farischon has been appointed news editor of News Service, succeeding Jerry Reichart who has taken a position as editor of employe publications at Cutter Laboratories, Berkeley, Calif. Jerry Cook has been added to the staff as news writer, supplementing the work of Fred J. Tuerk and J. C. MacMillan who joined the staff at the time Gordon W. Monfort, director of News Service, resigned to become advertising manager at Cutter Laboratories.

Hewitt-Robins, Inc., Buffalo, N. Y., has appointed I. H. Welch as a sales representative covering the central Iowa territory, with headquarters in Des Moines, Iowa.

Stewart-Warner Corp., Chicago, Ill., has appointed Gustave Treffeisen as sales manager of the Alemite distribution division, succeeding Charles I. Krause, who is now an Alemite distributor at Minneapolis, Minn.

Detroit Diesel Engine Division, General Motors Corp., Detroit, Mich., has announced the appointment of Royce A. Hill as field sales engineer for the northern section of the Dallas region, succeeding Fred L. Manton who has taken the position of sales manager with the Diesel Power Co., distributors for General Motors Series 71 engines in the State of Oklahoma. Lauren H. Wells has been named sales engineer for the northern West Coast zone, including Washington, Oregon and the northern part of Idaho. Victor Hansen will take over the southern West Coast section which covers California, Arizona and eastern Nevada.

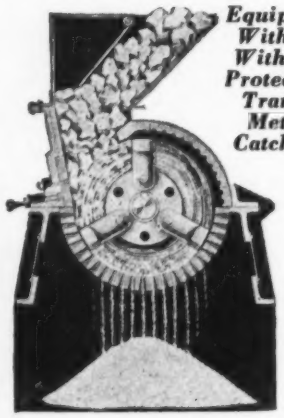
Chase Bag Co., Chicago, Ill., announces that G. K. Whyte has been named sales manager of the St. Louis office.

GRUENDLER CRAFTSMANSHIP SERVING INDUSTRY 62 YEARS

GRUENDLER'S MOST VERSATILE CRUSHER and PULVERIZER

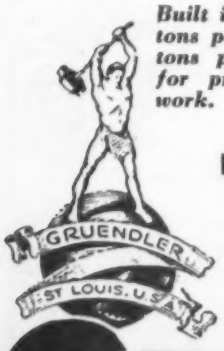
TWO-IN-ONE HAMMERMILL

The Adjustable Feature of a Gruendler Two-In-One gives you either a cubular crushed rock (no slivers or finger stones) for road or construction work —or will produce a uniformly crushed limestone ideal for mixes and topping or for Agricultural purposes.



Equipped With or Without Protective Tramp Metal Catchers

Cut-a-way view of Gruendler Pulverizer



Built in a size range from 3 tons per hour to 75 and 100 tons per hour. Larger sizes for primary and secondary work.

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2X Hammermills up to 15 tons per hr.
3X Hammermills up to 30 tons per hr.
4X Hammermills 50 to 150 tons per hr.
6X Heavy Duty Hammermills 200 to 500 tons per hr.
10x16 - 24x36 Jaw Crushers.
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FEEDERS — CONVEYORS — BUCKET ELEVATORS

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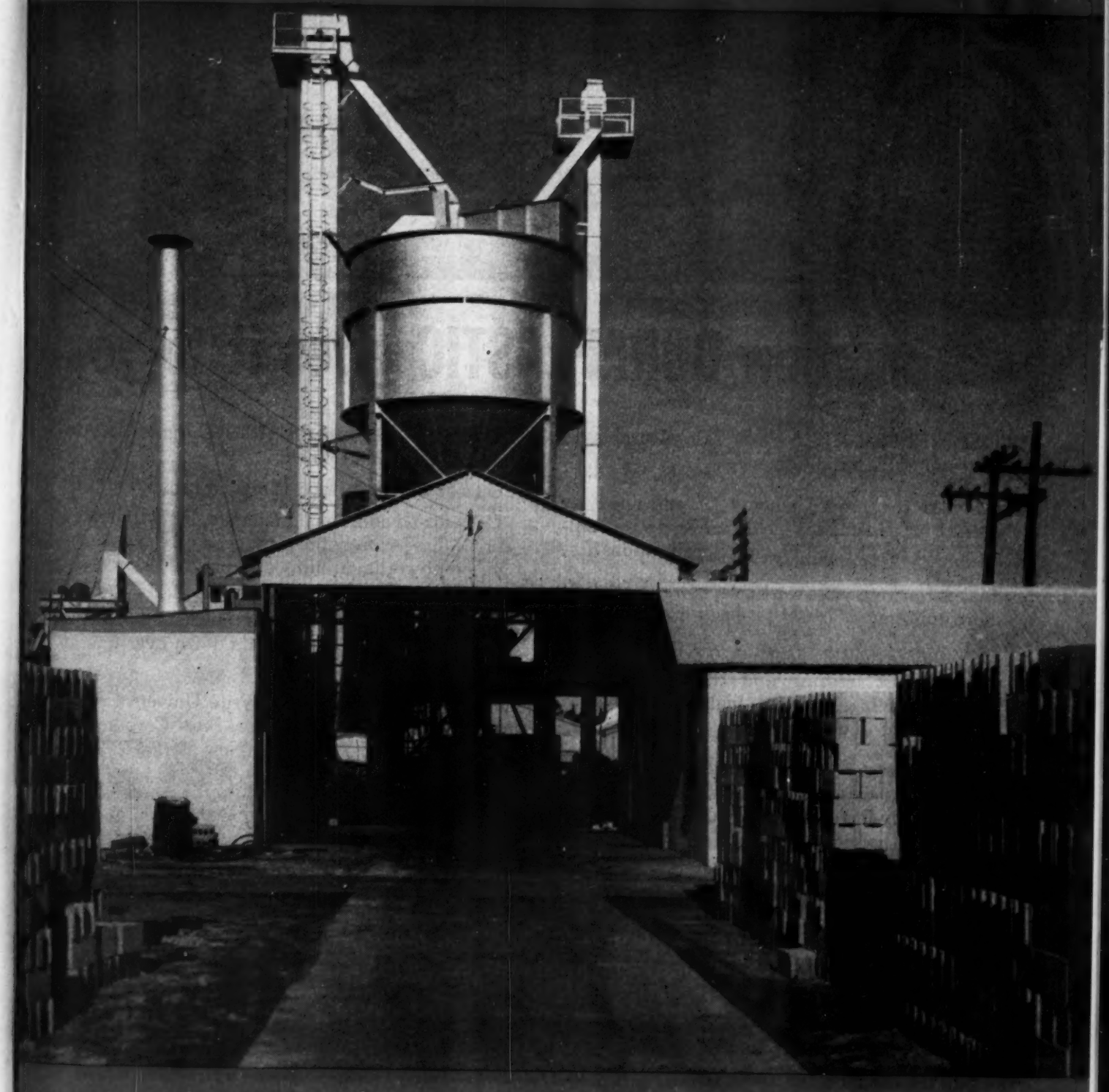
CRUSHER and PULVERIZER CO. • ST. LOUIS 6, MISSOURI

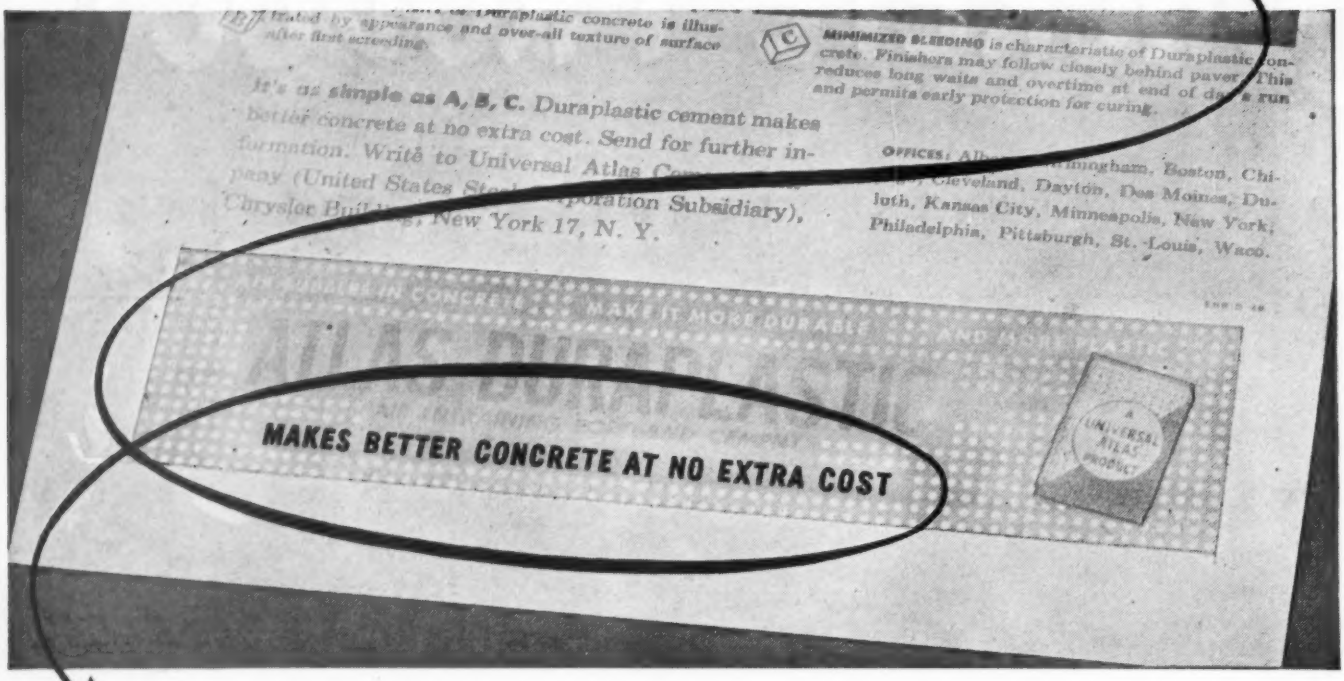
CONCRETE PRODUCTS

CONCRETE UNITS - READY-MIXED CONCRETE



• Modern plant of Alatex Concrete Products, Inc., has lightweight aggregates crushing and screening facilities, and rapid material handling equipment

What's behind this fact . . .


MINIMIZED BLEEDING is characteristic of Duraplastic concrete. Finishers may follow closely behind paver. This reduces long waits and overtime at end of day's run and permits early protection for curing.
It's as simple as A, B, C. Duraplastic cement makes better concrete at no extra cost. Send for further information. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.
OFFICES: Albany, Birmingham, Boston, Chicago, Cleveland, Dayton, Des Moines, Duluth, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.
MAKES BETTER CONCRETE AT NO EXTRA COST
A UNIVERSAL ATLAS PRODUCT

. . . and how DURAPLASTIC gives it to you

MAKES BETTER CONCRETE because Atlas Duraplastic Air-Entraining Portland Cement . . .

. . . Provides the proper amount of entrained air needed for satisfactory field performance. Complies with ASTM and Federal Specifications.

. . . Makes concrete more workable, more plastic and more uniform.

. . . Makes more durable concrete. Fortifies the concrete against freezing and thawing weather. Renders paving concrete highly resistant to scaling action of de-icing salts.

. . . Makes better concrete block. Reduces breakage, improves appearance, lowers water absorption and generally increases strength.

AT NO EXTRA COST because Atlas Duraplastic Air-Entraining Portland Cement . . .

. . . Sells at the same price as regular cement.

. . . Calls for no additional materials, little change in procedure—merely the same good care and supervision of workmanship.

. . . Is easier to handle. On paving concrete, promotes speed on the job, permits finishers to follow closer behind the mixer, cuts down overtime at end of day.

Send for further information. Write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

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CP-D-53

ATLAS DURAPLASTIC
TRADE MARK REG. U. A. C. CO.
AIR-ENTRAINING PORTLAND CEMENT
MAKES BETTER CONCRETE AT NO EXTRA COST

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—September to June—ABC Network*

Reduce Delivery Costs With Carrier Unit

Eureka Concrete Building Products Co., Eureka, Calif., has adapted lumber carrier to haulage of concrete block

By W. B. LENHART

AT A RECENT MEETING of concrete masonry manufacturers on the Pacific Coast a committee report was read stating that the cost of loading, hauling and unloading concrete masonry units was in the $1.60 per ton range. For a standard 8-in. heavy aggregate block this amounts to $64 per thousand units. If this figure is at all accurate and represents an average, it is apparent that there is a chance for considerable improvement in handling and in lower costs. Lumber is becoming more plentiful in the western states and the grade is improving, so competition from that source will be greater than it has been for several years. It behooves concrete masonry manufacturers to examine their operations critically in order to prepare to meet this competition. One way is to deliver the blocks to the user at lowest possible cost.

The Eureka Concrete Building Products, Eureka, Calif., a relatively new concern in the industry, established its plant about two years ago using an old style, Miles tamper, but last year installed a Victory Vibropac and now operates both machines, using the older machine for manufacture of rock-face building units. The Miles machine can manufacture close to 900 units in 8 hr. and the Victory, 1800 per 8-hr. The latter machine makes one 8-in. unit per cycle, two 6-in. and three 4-in. units.

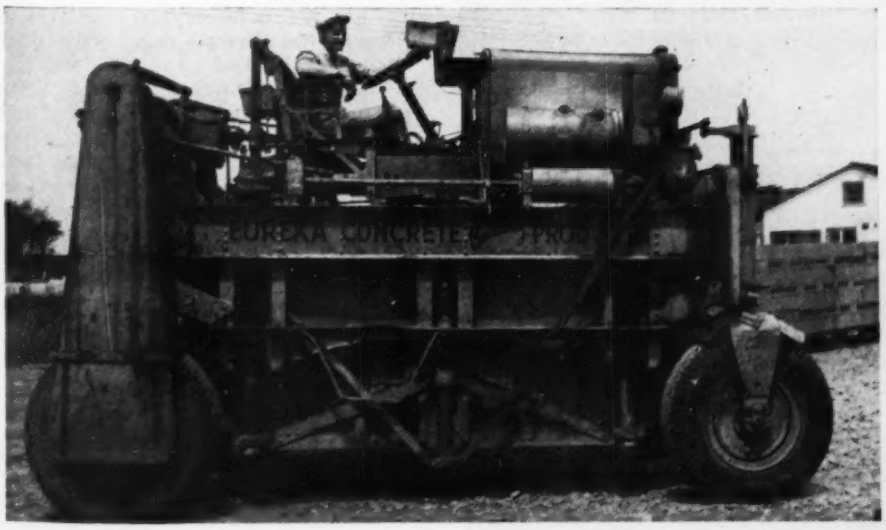
Use Lumber Carrier for Block

Mainly of interest at this plant is the method of handling units in and about the plant and in delivery to the customers. For this purpose, a Ross, "Straddle" lumber carrier is used. These carriers are a common sight on most city streets and are simply high-wheeled lift trucks that straddle over a pile of lumber, lift it by side lifters, and transport the load away.

Eureka is a city of about 19,000 population, and is located about 250 miles north of San Francisco right on the Pacific Coast. It is the center of the famous redwood forests and lumbering is one of its oldest and largest industries, so it is fitting that this company should go to the lumber industry to help solve its transportation problems.

The green masonry units from either of the two block machines are placed on conventional steel racks and are kept on the floor for 24 hrs. At the end of this time the blocks are taken off the racks by hand and piled on a very simple pallet that will be described in detail later. The size of the pallet is such that it will hold up to 312 block or about six tons. When the pallet is loaded the Ross carrier comes in, straddles the pile, and in a minute or so has the load into the gravelled storage yard. Here the blocks remain on the same pallet until they are delivered to a customer. Owing to the location of Eureka on the ocean, the air has a high moisture content and curing the blocks is not a problem. However, during a few months of the year when air is at its driest, the piles of cubed block are kept moist for 10 days.

Front end view of carrier designed to haul lumber which has been adapted for transporting block to destination



Straddle carrier hauling concrete block on pallets from plant to jobsite

Use Pallets of Various Capacities

Pallets are of various sizes, some of the pallets holding 198, 250, etc., block. When an order is filled the carrier can select a pallet suitable for the order. Thus the major portion of the block is only handled once.

The Ross carrier delivers any place in the delivery area and can go any place that a truck can. This machine is an older style and has three forward speeds and three reverse. Newer models have four and four speeds, forward and backward, respectively. The carrier in this case travels with a load at average speeds of around 30 m.p.h., and to date has not had any spills or other troubles. In many instances the carrier has carried loads to large buildings and distributed the loads inside the structure at any designated spot the contractor indicated, its short wheel base permitting it to turn in a small radius. As for hills, or rough terrain, if the ground is solid enough to support a truck, the Ross carrier can make deliveries.

Some operators have considered using these carriers with steel bars run through the cores of the bottom layers but gave the idea up in favor of the pallets. The handling of units by the steel bar method would have

required that block be at or near full strength. By the use of pallets, block of any age or strength can be easily handled.

Eureka Concrete Building Products, Inc., formerly delivered units by conventional truck, and used three men and a truck to make delivery of 1200 standard 8-in. units per day. With the Ross carrier 2500 similar blocks are delivered per day and with only one man. For deliveries in town, an additional haulage charge of three cents per unit is assessed, regardless of the size of the block. For deliveries in the 5 to 10 mile range, a charge of four cents is made. On this basis, the gross income from the carrier is $75 to $100 per day. As the newer type machines were said to cost in the $5000 to $6000 range, the carrier is paying for itself every few months on this basis. The newer type machine has a speed range up to 45 m.p.h.

The pallets used are not one piece. They consist of three, 3 by 8's each 54-in. long (or the width of the carrier). Short 6- x 8-in. wooden blocks are nailed to them at each end. These block rest on the ground and enable the carrier's lift mechanism to get under the load. On top of these three cross members are laid planking (without nailing) 2 x 10's or 2 x 12's, and on top of these are piled the concrete block. The length of the planking depends on the size of the load being hauled, with the six-ton loads taking up about the full length of the carrier or about 10-ft. Block are piled to a height of 4-ft. on the pallets.

The carrier rolls over this load and lifts it about 6-in. off the ground. Permanently fixed to the under-carriage of the carrier are two 2 x 8's. When the load is elevated, the top row of block compresses against these two sticks and cushions the load and gives it stability.

The pallets are returned by the customer when the jobs are small but on larger projects the company assumes responsibility for their return. Inasmuch as the pallets are not spiked together, they can be hauled in most any pick-up truck. The wood used is pine; redwood was found to lack strength.

Most of the units are manufactured of aggregates from a local pit and are stored on the floor in the rear of the building housing the block machines. Sacked cement is used. A 9 to 1 mix is used and compressive strengths are well over requirements. Haydite is secured from San Rafeal, Calif., for lightweight unit manufacture. Tests made by the Pittsburgh testing laboratory reveal the following data: 8- x 8- x 16-in. concrete block with gross area of 117.8 sq. in., compression test: crushing load, 280,000 lbs.; crushing strength per sq. in., 2,376 lbs.; absorption, 4.9 per cent and specific gravity, 2.23.

Eureka Concrete Building Products is a partnership. Carl Guettler and Loran Weismiller are the owners and Arnold Maahs, plant superintendent.

Classification Plan For Ready-Mix Plants

AS CONSIDERABLE variation exists between formulas and end product of any two or more ready-mixed concrete plants due to chemical and physical differences of basic materials used; and also wide discrepancy is found between types and condition of batching and mixing equipment, a rating plan has been suggested as desirable. Such a plan would enable an operator to use only the amount of cement in his particular plant required to consistently supply concrete of a specified strength.

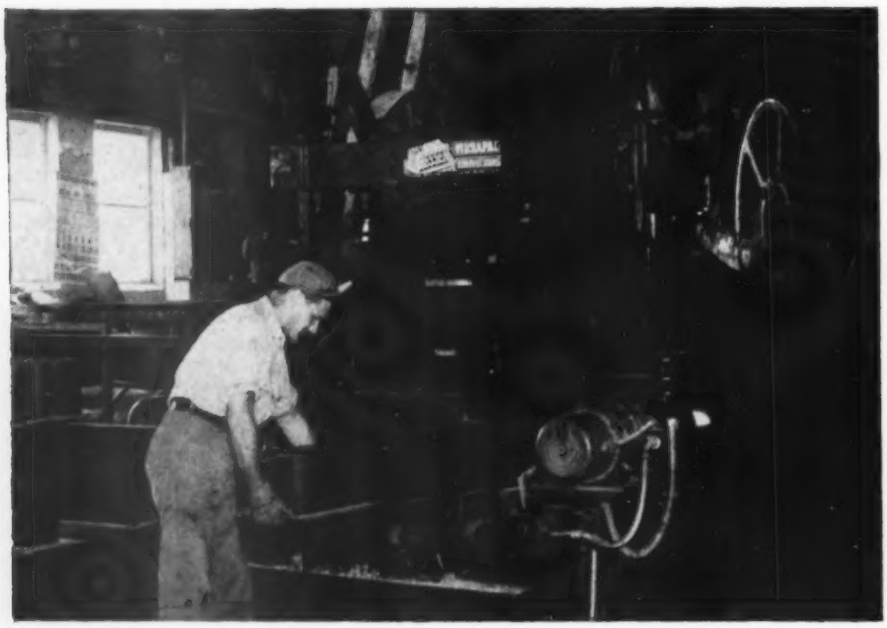
In a recent issue of *Engineering News-Record*, L. D. Long of the Newark (New Jersey) Testing Laboratories suggests a plan for "merit rating" ready-mix concrete plants. Mr. Long takes the position that such a plan would provide an incentive for commercial plants to produce only uniformly good concrete.

Ready-mix concrete plants would be classified *A* through *F* according to a check chart drawn up by Mr. Long that would allow points to be scored under the following general classifications: stock separation and aggregate sizes available; weighing techniques; water control; mixing machinery; and inspection and testing provisions. The point values assigned in each classification are purely arbitrary, but represent the consensus of engineers, testing laboratories and contractors consulted.

The importance of test cylinder performance is also stressed, and provision is made for added scoring under this head. Test cylinder performance ratings are based on the paper "Application of the Theory of Probability to the Design of Concrete for Strength Specifications" by Stanton Walker, engineering director of the National Ready Mixed Concrete Association. Few ready-mix plants have such records available due to the fact that when strength tests have been made they usually have been run on concrete produced to meet certain definite specifications, and therefore do not accurately reflect the plant's entire output.

The tables and graphs that appear in the article and that would serve as a basis for grading ready-mix concrete plants (*A* through *F*), provides a striking demonstration of the saving in cement in the well inspected plant over the poorly managed plant. In one of Mr. Walker's charts it can be seen that a Class-E plant, without inspection, would have to design for 5,000 lb. in order to consistently produce 3,000 lb. concrete.

The rating plan has an important aspect in its possible use by the buyer of concrete. A buyer would be able to fix separate strength requirements for each plant bidding on his job. But Mr. Long emphasizes that the success for operation of the plan outlined would depend wholly on the integrity of the plant management and personnel. Good equipment means little unless used with the intent and knowledge necessary to perform honest and effective work; and the plan itself could produce abuses if not used honestly.



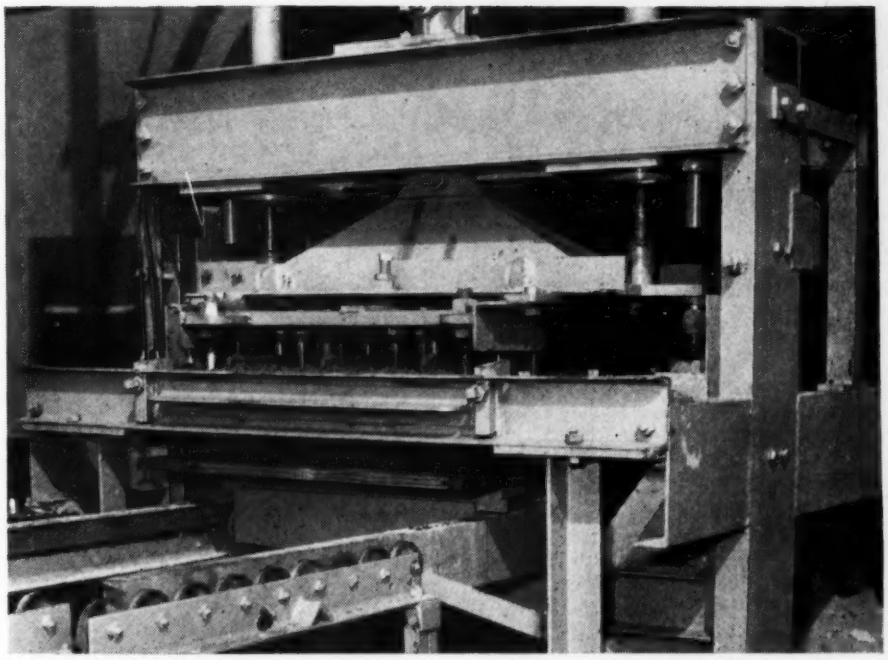
High production block machine recently placed in operation

Vote Down Concrete Plant Regulation Ordinance

AN ORDINANCE, which would regulate and license concrete mixing plants within the city limits of Madison, Wis., and provide penalties for violations, was recommended for nonadoption on a 5 to 1 vote when presented to the council committee.

One Machine Replaces Battery of Small Machines

General Concrete Products Co., Van Nuys, Calif., replaces battery of small block machines with large capacity machine



Press-out plate being lowered on to units in mold, starting to press out the blocks

ONE of the oldest concrete masonry producers in Southern California is the General Concrete Products, Inc., Van Nuys, Calif. E. P. Ripley, who is prominent in the trade, is president of the company and very active in association affairs relating to concrete products in Southern California. For years, the plant at Van Nuys had a battery of Flam vibrating machines placed about a centrally-located mixer in such a fashion that a large production was obtained with a minimum of labor. These small machines have all been removed and replaced with a Flam Auto-hydromatic machine that was invented and developed by Stephen Flam.

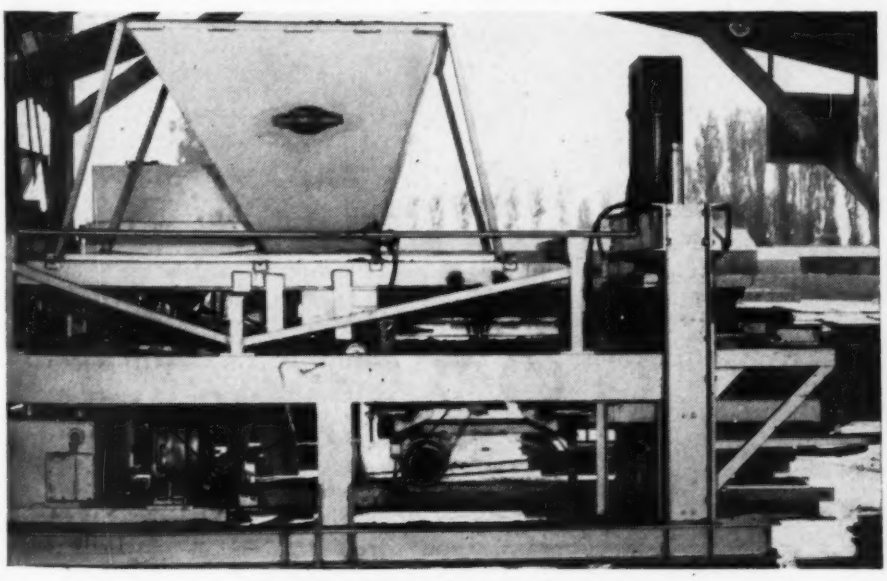
This machine has many novel features: it makes eight units at one time, of 8- x 8- x 16-in. size, the 8- x 4- x 16-in. or the 8- x 4- x 12-in., at the production rate of three cycles per minute. This will give slightly in excess of 11,000 blocks per 8-hr. day. Wood pallets, 32- x 35-in. size, easily accommodate the eight structural units.

The machine weighs about 7500 lb. and requires about 8-ft. of head room including the hopper. The machine uses two electric motors, one for the vibrating mechanism and the other for the hydraulic pump. A total of 9 hp. is required. The entire assembly is mounted on electrically-welded steel form so that no special foundations need be provided. At this plant the unit has been levelled up with a few small wood blocks that rest on a concrete floor.

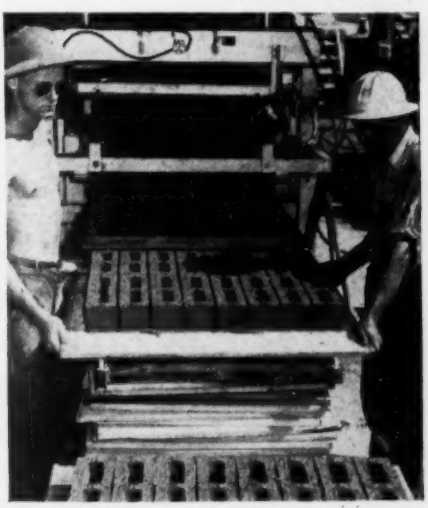
The 50-cu. ft. mixer previously used now discharges to a steeply-inclined belt conveyor that elevates the concrete to the top of the machine hopper. A wetter than ordinary mix is used, the mix having practically no slump. The company believes that the wetter the mix is (and which will still enable making a block that will stand up) the better the resulting block. No racks are used, as the vibrated units are of such consistency that the filled pallets can be placed immediately on top of the freshly made units to a total of five pallets high. At the time of inspection two men were off-bearing the loaded pallets and piling them in stacks so that a Scoopmobile forked truck could transport them to the storage yard. After 12 hrs., the block are unloaded off the pallets into permanent stacks, where they are water-cured under burlap for seven days, then sun-dried for 21 days before shipping.

The cycle of operation of the machine is as follows: (1) A small hopper that travels horizontally is first gravity-filled from the main hopper;

(Continued on page 129)



Side view of high production block machine



Showing how concrete brick are handled on pallets from the machine

HYDRAULIC Operation Simplifies Pipe Manufacture

IN the San Joaquin and lower Kern river section of California, represented by the areas around Bakersfield, Fresno and intermediate points, there has been a considerable growth in the concrete pipe industry the past two years. There have been a number of new plants established in the area.

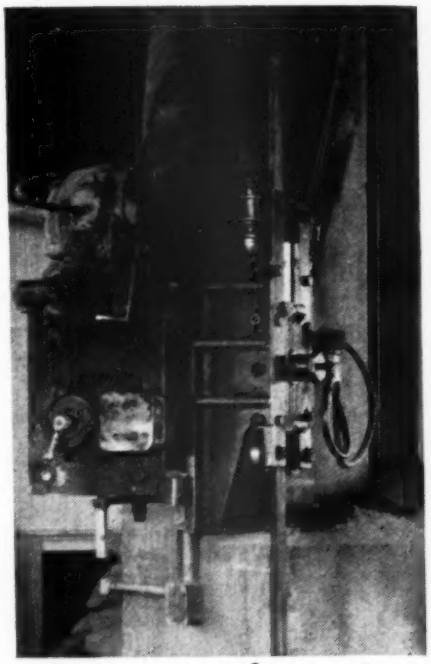
One of these plants, the Fresno Concrete Pipe Co., Fresno, Calif., has recently been established in the southwestern outskirts of that city. The company uses a new machine made on the Pacific Coast called the "Tampmaster," a heavy-duty pipe machine manufactured by W. Thomas Pease. This machine is a tamper-type but has several refinements that may be of interest to the trade.

The tamper, which is mounted on a heavy steel arm that swings in a horizontal plane, has a tamping mechanism that moves laterally along this arm by a hand crank mounted near the gear-head motor actuating the tamper. This gear-head motor has a 200-lb. flywheel. The tamper sticks are held in place by friction imparted to the stick by a hydraulic cylinder. The entire assembly is so mounted on the main arm that the tamper stick is practically at the same position with respect to the periphery of the pipe being made, regardless of the pipe's diameter. By means of several adjustments the tamper stick can be placed over the form and held there regardless of the diameter of the pipe being fabricated. The use of the device for holding the sticks permits them to be used longer than is the practice at most plants, it was said. Tension on the tamper stick is always constant due to this hydraulic cylinder applying the pressure.

All of the mechanism relating to the tamper is rugged and well designed and gives the appearance of durability along with machine-like accuracy of construction.

To date there are only a few of these machines in operation; yet their interest is so great locally that at the time of inspection 90 different concrete pipe manufacturers throughout the country had visited the plant to see the machine in operation.

The pipe core and bridle support are raised vertically by hydraulic means, with controls within easy reach of the operator. The overhead assembly for raising and lowering the core and the tamper assembly is mounted on two concrete piers and is entirely separate from the table therefore eliminating any vibration being transmitted to the pipe being tamped. The machine is all push button controlled and does not use any clutches. At this installation the 2-sack mixer is set at floor line and it discharges to a skip that discharges to a small hopper above the machine. This hopper has stirring mechanisms in the bottom and feeds a steady flow of concrete into the forms. The forms are made locally. The machine manufactures pipe up to 36-in. diameter size.

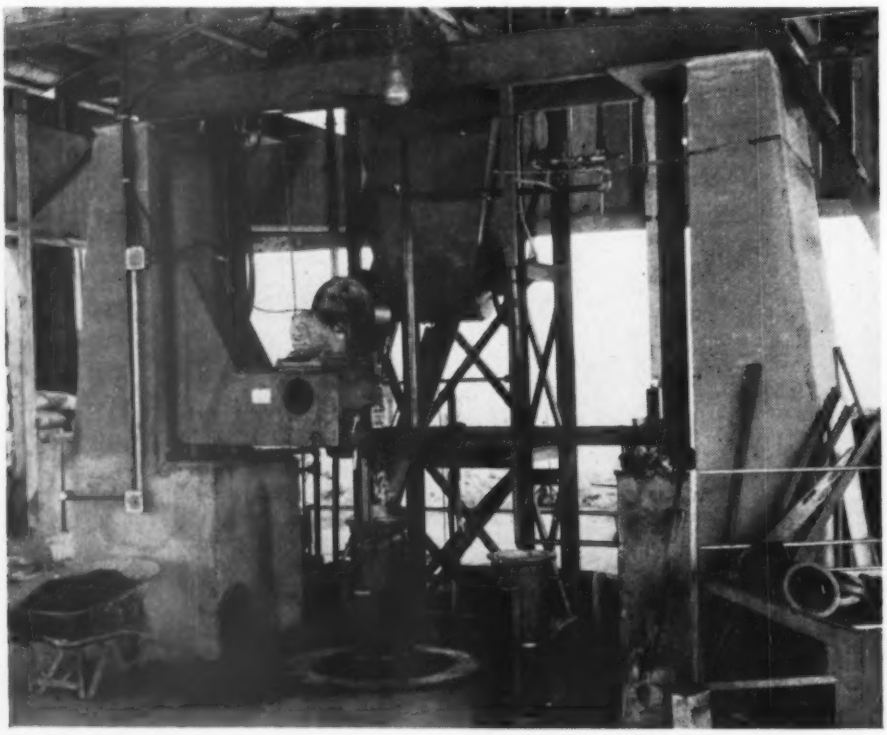


Tamper stick of pipe machine held in constant tension by hydraulic pressure (right, center). Crank at the top moves the tamper assembly along carrier arm

The green pipe are cured in the yard, sprayed with water and kept damp for seven days before stacking in the yard. A Scoopmobile is used for handling the pipe with a pronged lifter that lifts six joints of 8-in. pipe or four of 16-in. pipe at one time. Two men can move a day's output of pipe with this device in less than two hours.

Like most of the pipe manufacturers in the area, the company installs the pipe and, on most projects, takes the contract for the entire irrigation or drainage project. The company has no machine trencher but lets out the digging contract. Sacked cement, ½-in. crushed rock and sand are used for making the concrete.

The Fresno Concrete Co. is a partnership of G. N. Black and E. L. Church, owners.



New tamper type concrete pipe machine. Heavy welded steel arm swings in horizontal plane

Plan New Type Precast Concrete Wall Panel

ATF, INC., Elizabeth, N. J., has recommended to the Reconstruction Finance Corporation, through Housing Expediter Frank R. Creedon, a guaranteed market contract for the production of a new type precast concrete wall panel for use in residential construction to be sold under the trade name of Fabricon. Although the contract covers production of panels only at one plant, the company plans to furnish machinery, equipment and materials for a number of similar plants throughout the country.

Building Products "Department Store"

Pacific Coast Aggregates Co. sells two dry mix products, ready mixed concrete, and complete line of building products

By W. B. LENHART

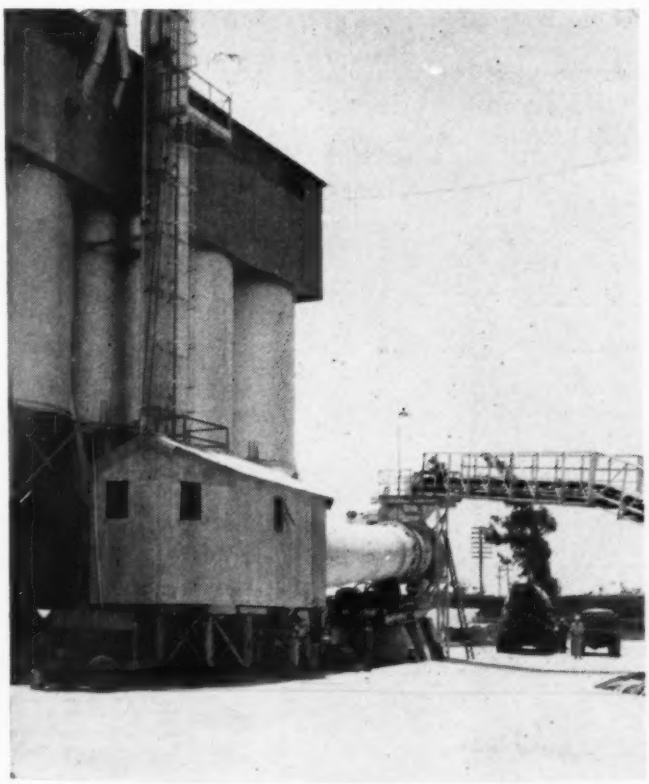
ONE of the most modern distribution yards and ready mixed concrete batching plants in the West was recently placed in operation by the Pacific Coast Aggregates Co., in East Oakland, Calif. This company, with headquarters in San Francisco, has production plants and distribution facilities throughout the central part of California. One is impressed by the neatness and orderly appearance of the entire assembly.

Various units making up the yard include: 12 steel aggregate bins, each bin holding 120 tons of material; the ready mix batching plant which has two steel cylindrical bins for cement and a divided bin of six compartments for sand and gravel that has a total capacity of 360 tons; the rotary drying plant with its six additional steel silos for holding the dried aggregates; and a large and commodious warehouse for the many items that the Pacific Coast Aggregates Co. now handles. The warehouse is stocked with many brands of sacked cements, lime, plaster, building paper, steel sash, paints, etc. In one 40- x 140-ft. wing of this warehouse is the sacking equipment for preparing Mix-Kwik and Mortar Mix, two new products that the company has added to its growing line of building materials.

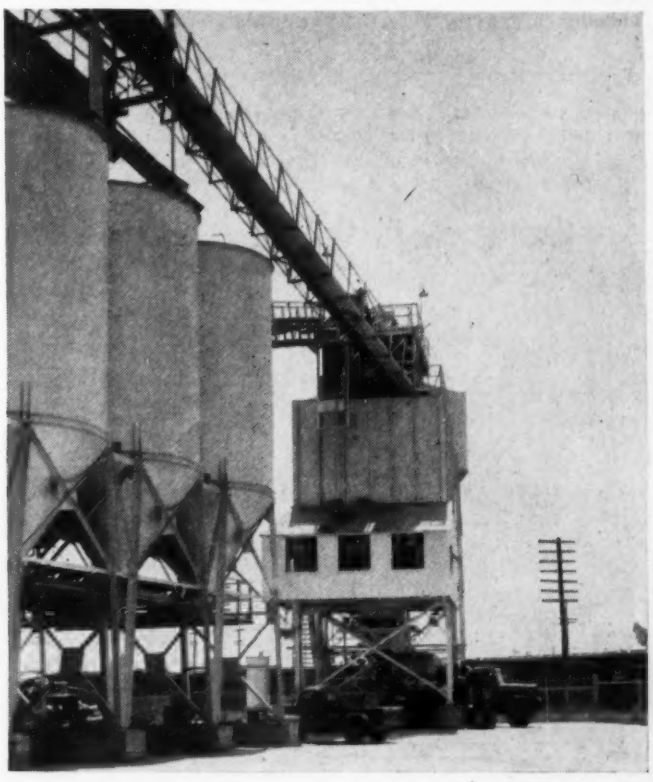
Market Two Dry Mix Products

Mix-Kwik is a trade name for dry batched concrete made up of a designed mix of pea gravel, sand, and portland cement which is sold in 90-lb. paper bags. It is so proportioned that all that is required is to mix one gallon of water with the contents of the sack and the resulting concrete is ready for use. The mix used is roughly 4 to 1, and the sacked product retails for $1 per sack. It is much used by home owners for patching and repairs about the home and for small construction work such as barbecue pits, retaining walls, stepping stone, etc. The AAA is using this sacked material for highway sign foundations. Sales volume of this novel product has surprised those responsible for its introduction. Mortar Mix with lime, fire-clay, etc., as ingredients, is merchandised in a similar way.

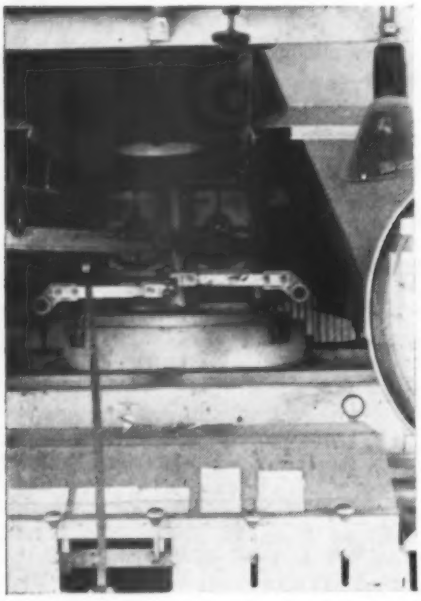
For the preparation of these two products and to dry sand for sand blasting purposes, the company has installed a 5- x 60-ft. rotary drier which has a capacity of 30 tons of dry sand per hour. Damp sand or pea gravel is delivered to the drier by a cross belt conveyor. The drier is fired by natural gas, using a Ray burner with a Flame-Otrol control. Either gas or oil may be used for fuel. The dried products are chuted to a bucket elevator which delivers to a shuttle conveyor serving any of the six storage silos. From the silos the material can be drawn into trucks, or can be spouted to the Vredenburg sacker inside the warehouse. This sacker is a one-tube unit designed for handling coarser materials. To get the proper proportions for the sacker, the sand, pea gravel, and cement is spouted to



Rotary dryer with feed conveyor to the right



Batching plant with transit mix truck taking a load of concrete



Cement weighing hopper is fed by either of two screw conveyors, the ends of which are shown above

Synocrogear motor drives shuttle belt conveyor. The electrical contact is through a shoe and rigid conductor, shown above

Shuttle conveyor on top of aggregate storage bins

three Syntron vibrating feeders which deliver direct to the sacker. These inexpensive units can be regulated to give a small and uniform feed so that an accurate mix is maintained. After sacking in paper bags the filled bags are placed on wooden pallets and handled about the warehouse with a Mac Donald lift truck.

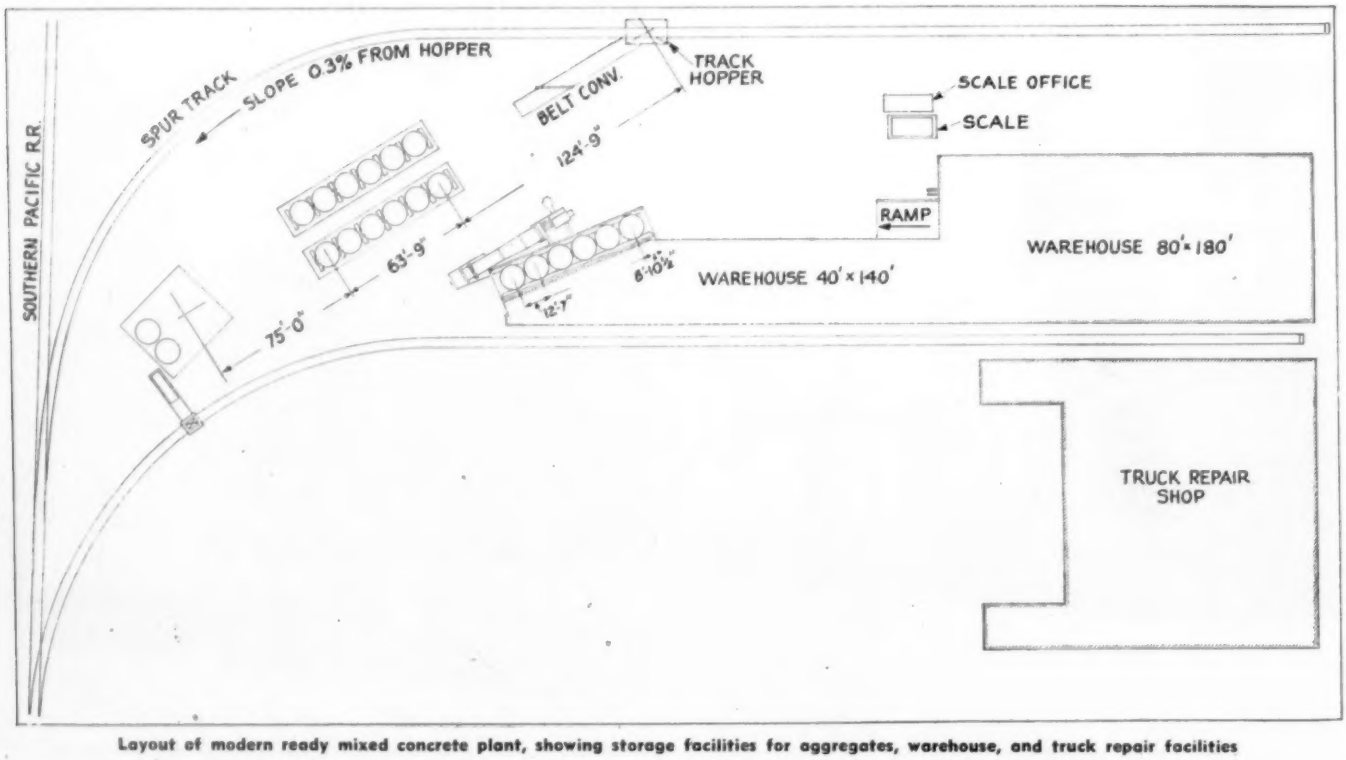
Aggregates Handling System

The sand and gravel is delivered to the plant over a Southern Pacific track and unloaded at a track hopper. Through a gravity gate the materials fall to a long 24-in. inclined belt conveyor that delivers either to the bins over the ready mix plant, or to another inclined belt that moves the material to the highest point over the 12 aggregate bins. From this high point the material is spouted to a shuttle conveyor over the silos, each size falling to its proper bin.

The 12 silos are arranged in two rows of six silos each, and between the two rows are two more belt conveyors so arranged that they can deliver to the long main belt serving the ready mix plant, can transfer the material to the drier, or can take the contents of any one bin and convey it to any other bin. The steel silos were supplied by the Western Pipe and Steel Co. Inclined conveyor units have locking brakes so that if power fails when the belt is loaded there will be no back spill. All the main conveyor belts were supplied by American Rubber Co.

Batching Plant

Over the batching plant is a swivelled chute that serves the six compartment bins. This chute and the gates at the outlets of all the 12 silos

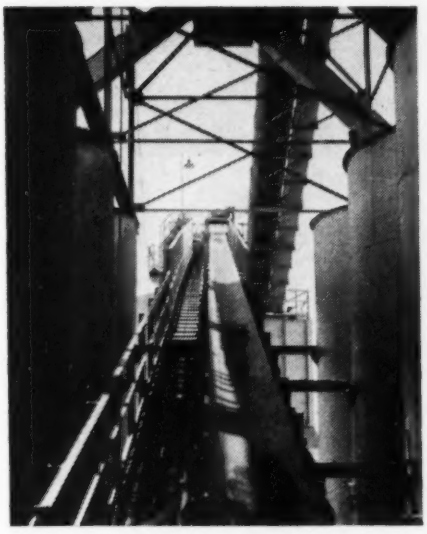


Layout of modern ready mixed concrete plant, showing storage facilities for aggregates, warehouse, and truck repair facilities

feeding the conveyor belts are controlled from a platform strategically placed near the top of the assembly. Shuttle belt conveyors are moved by a double drum Sasgen hand winch with electric current being transmitted to the U. S. Syncrogear motor through an overhead, rigid electric conductor and a shoe that travels with the shuttle. All conveyor motors are controlled from the operator's platform near the top of the plant or from a point near the ground line. A system of Square D interlocking switches insure stoppage of the proper conveyors should the off-bearing conveyor stop or stall.

Bulk cement is delivered to the plant by rail or by truck and discharged to a common receiving hopper. A screw conveyor and bucket elevator delivers the cement to one of the two silos each holding 500 bbl. of cement. The batching plant uses equipment supplied by the Conveyor Co. of Los Angeles. In this set-up the cement is weighed separately, using the electronic weight controls for the cement. This dial scale has a capacity of 5000 lb., graduated to 5 lb. On the aggregate side the weights are controlled by the operator through air-operated gates. The aggregate scale has a capacity of ten tons. The aggregate hopper, which is built more or less around the cement hoppers, is designed for a 5-cu. yd. mix but is oversize so that a 5-cu. yd. batch can be made by using only one side (3 gates) of the batching equipment. Water supply is controlled through a Neptune meter.

The company has a fleet of 15 Smith mixers mounted on Peterbilt trucks operating in this section of Oakland. At the close of each day the equipment is washed down and kept in top operating condition. Trucks and mixers painted with the colors of the Pacific Coast Aggregates, with red predominating, present an attractive



Main conveyor belt to the ready mixed concrete bell or to return belt serving storage bins

appearance on the road. This fleet of trucks also serves the company's Peralta street plant.

Air for operating the batching plant is supplied by a Reliance compressor. The compressor discharges to a Saracco 30-in. x 6-ft. vertical air receiver.

The entire plant, which was designed by engineers of the Conveyor Co., was built by the Pacific Coast Aggregates Co. Tom Moriarity is superintendent and E. A. Ford is dispatcher.

The entire area surrounding the various units making up the yard is paved with concrete. A neat office serves the distributing yard and houses a set of Fairbanks truck scales equipped with Howe Scale Co.'s weightograph.

Volcanic Aggregates For Block

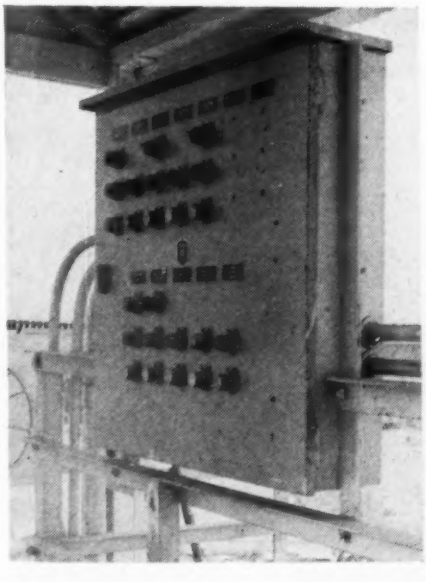
BAKER CEMENT PRODUCTS CO., Baker, Mont., recently started operation of a new plant located at Baker where volcanic rock is available as aggregates. The company which also operates a concrete block plant at Mobridge, S. D., had originally planned to ship the aggregate from Baker to Mobridge, but now will install two crushers at Baker for the anticipated expansion of this new plant. The company is owned by C. G. Berwold, manager, Mobridge, and M. G. Olsen, Rock Rapids, Iowa.

Forms for Concrete Houses

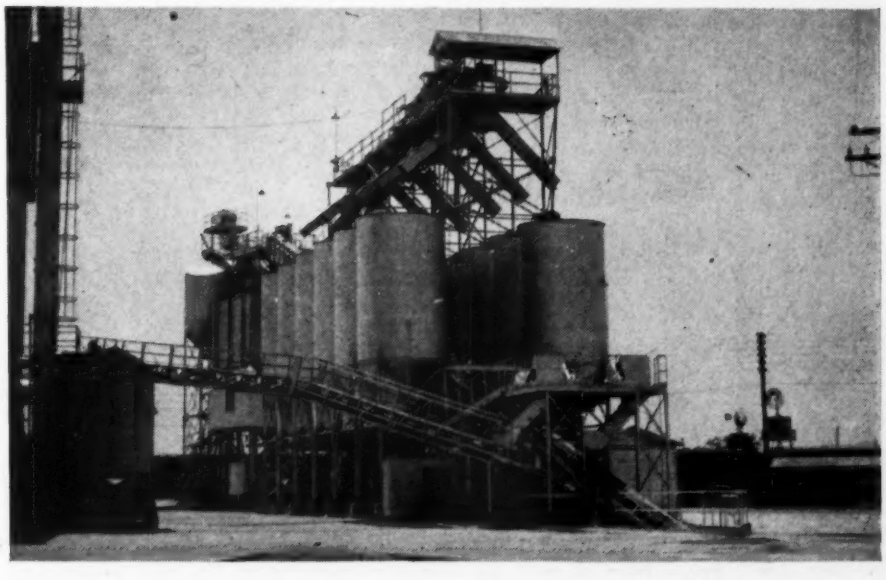
IRVINGTON FORM & TANK CORPORATION, Irvington, N. Y., manufacturers of concrete forms of all types, has developed the Atlas speed forms for the construction of houses as well as industrial structures. The concrete houses can be poured at the rate of one-and-one-half a day with two sets of forms. These forms are supplied in complete sets for pouring an entire house, including exterior walls, interior walls and roof. The forms are of steel, made up of units which are said to be simple to assemble with wedge bolts and clips. Studding is not required for support of the wall. Standard snap wall ties keep the forms the specified distance apart, and tie wedges secure the walers of either 2- x 4-in. lumber or steel angles. It is said that the only support usually needed is an occasional strong back on one side of the wall only. The steel slab forms used for the roof are also simple to set and strip since they do not require joists for support. When laid together, the steel slabs lay flat on girts and the panels form a tight joint through which no concrete will pass.

Concrete Specialist

MIDWEST CAST STONE CO., Sioux City, Ia., makes a specialty of solving concrete problems in addition to producing cast stone, pre-cast joists and concrete block. Milton Alingh is president of this versatile company.



Control board for plant is mounted near top



General view of storage bins with ready mixed concrete plant behind bins

Gravity Flow

Build Products Plant to Reduce Material Handling

Ladd Lumber and Mercantile Co., Pueblo, Colo., produces its own scoria lightweight aggregate

UNTIL RECENTLY the larger cities in Colorado were able to supply the demands for lightweight concrete masonry units by the use of cinder aggregate, but the growth of the block industry has been such that other lightweight aggregates have been called in to help satisfy the demand. The Ladd Lumber and Mercantile Co. of Pueblo, in cooperation with the Cinder Concrete Products Co. in Denver, recently opened up their own scoria pit on the east slope of Mt. Capulan, a few miles north of Des Moines, New Mexico. This is in the northeast corner of that state.

With an assured and steady source of excellent lightweight scoria as one raw material for lightweight block, the company last year placed in operation its new block plant using a Besser Vibrapac. The method of installing the machine is quite interesting and unusual for instead of having the usual bucket elevators for bulk cement or for aggregates, the company was able to so install the equipment that trucks could dump direct to the steel bins mounted over the mixer. The company's plant is located near the heart of downtown Pueblo and alongside Fountain Creek. The site is such that by cutting back into the bluff overlooking Fountain Creek, a vertical height of about 52 ft. was obtained. This height was sufficient to provide continuous gravity flow through the plant. The Vibrapac was

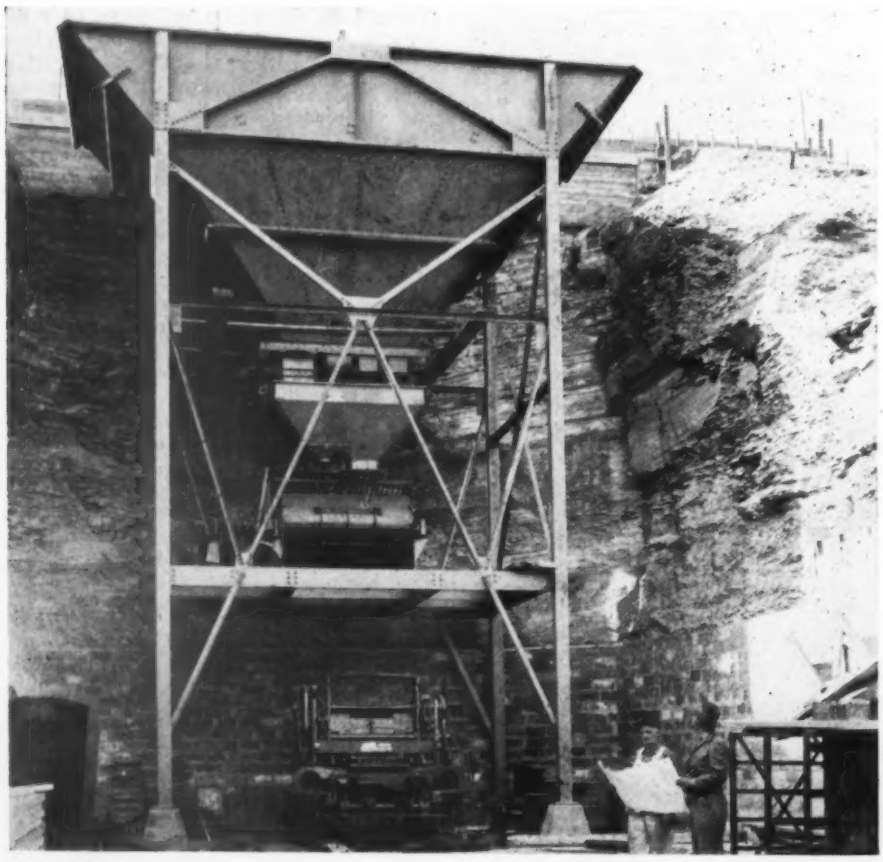
Tractor and dozer push cinders into hammermill feed hopper

installed on the main ground floor, and above it the 50-cu. ft. Besser mixer. Above the mixer is the Heltzel weigh-batching equipment for the aggregate and bulk cement, and superimposed on top of this assembly is the four-compartment steel Heltzel bin. A long, gradual dirt ramp leads to the top of this construction and dump trucks can dump direct to the bins.

After this construction was completed, the company built two steam kilns close by, each kiln holding 3500 of the standard 8- x 8- x 16-in. block.

The bins have a capacity of 120 tons of scoria plus cement for about one day's run. If used for sand and gravel, the bins would have a rated capacity of 200 tons. At the time of inspection the plant was turning out 720 standard 8- x 8- x 16-in. masonry units per hour, and was operating on a 11-hr. day basis.

The Ladd Lumber and Mercantile Co. makes five different kinds of block; sand and gravel, cinders, scoria, pumice, and a block made up of a mixture of scoria and cinders (one part cinders to two parts scoria). These block weigh 44, 30, 30, 20 and 30 lb., respectively. The scoria block



Construction view of concrete products plant showing how bins, batcher, mixer, and block machine were all mounted within a single steel framework in an excavation cut out of a hill to provide complete gravity flow of materials which are dumped by trucks, above. The plant building was then built around the equipment

Conveyor loads scoria cinder product of hammermill into trucks

command about 1¢ per block more than the sand and gravel (or cinder) with the pumice block running about 4¢ per block higher than the heavy aggregate block. In spite of this extra cost, the sales of pumice block have been growing steadily somewhat to the surprise of the officers of the company. The scoria-cinder block has the advantage of high compressive strengths with a nominal amount of cement as it is fairly easy to get 1200-lb. strengths. The pumice is purchased from Pumice Aggregates Sales Corporation, Albuquerque, N. Mex., with a processing plant at Domingo, N. Mex.

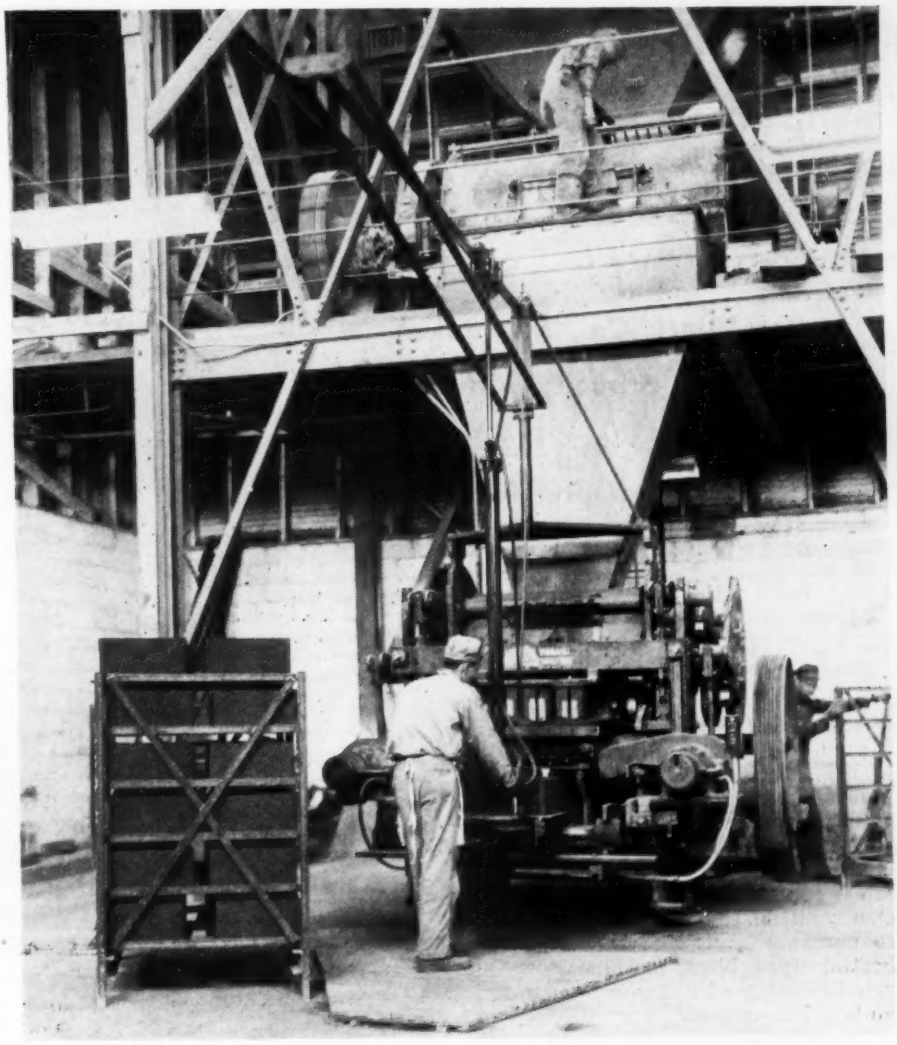
In spite of the fact that the company uses five different kinds of raw material for its concrete masonry units, the amount of finished block on hand is surprisingly low. The finished block are handled about the yard with a Towmotor and a Clark lift truck.

Scoria Plant Operation

At the company's cooperative pit on Mt. Capulan, the scoria is loaded and hauled under contract to Winslow and McMillan. A ¾-cu. yd. Lima shovel loads to a fleet of three Galion dump bodies mounted on Ford trucks. Two of the bodies hold 7½ cu. yd., and one holds 9 cu. yd. The trucks have a haul of about 6½ miles, and are loading from three to six cars per day at present. Stanley Jones is in charge of the work for Winslow and McMillan.

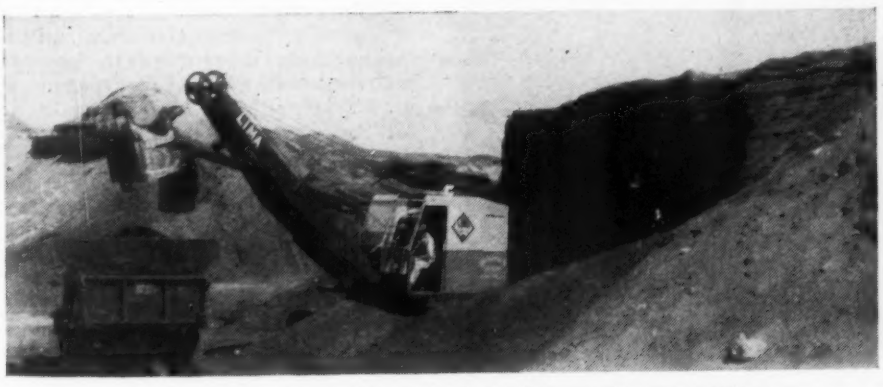
The pit-run material is practically all minus ⅜-in. with only a few inches of overburden to worry about. Some of the scoria is black in color with some having a reddish tinge. The former is said to be the lighter aggregate with the coarser of this weighing 1400 lb. per cubic yard. The fines run higher than this in weight. At present pit-run material is being shipped but the company may later install screening equipment at the pit to screen out the finer sizes. With screens at the pit, about 18 per cent of the total would be rejected thus making a material saving in freight and a lighter block resulting from the rejection of the fines. Freight into the Denver and contiguous area is about $90 per car.

At the plant of the Ladd Lumber and Mercantile Co., the scoria is unloaded to ground storage and reclaimed by a scoop lifter. The coal cinders are also unloaded to ground storage but before being used in the Besser are ground to minus ⅜-in. in a Jeffrey swing hammer mill that discharges to a portable inclined 18-in. belt conveyor supplied by the Chicago Automatic Conveyor Co. Cinders are pushed to the throat of the hammer mill by an Allis-Chalmers "K" tractor and dozer. Hammers on the mill last about a week.



Block plant in operation. Note the ample headroom and excellent lighting

Owners and officers of the company are A. A. Ladd, Sr., A. A. Ladd, Jr., Wilber Ladd and John Ladd. Harold Collins is superintendent of the block plant.



Loading scoria cinders which are trucked to hammermill for processing

N. Dakota Ready-Mix Plant

BUTLER CONSTRUCTION CO., Grand Forks, N. D., has entered the ready-mixed concrete business. In the new plant, aggregate is elevated from rail hoppers by a 250 ft. centers belt conveyor to storage bins rising 125-ft. above ground level. Bulk cement is used. Materials are proportioned to the two mixer trucks by weight. It is planned to purchase two additional mixer truck units in the immediate future.

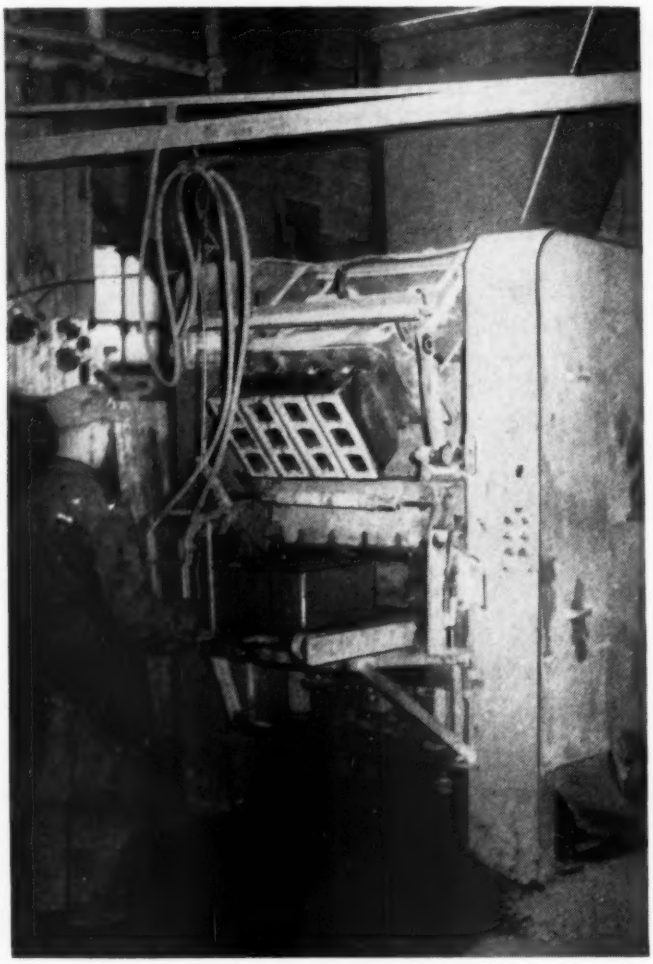
Grant Wage Increase

A NEW CONTRACT, granting an hourly increase of 15¢ to ready-mixed concrete truck drivers, has been signed by Teamsters and Chauffeurs Local 61 with the Granite City Supply Corporation and Lybarger Construction Materials Co., it was announced recently in Granite City, Ill., by the union business agent.

MODERNIZE Block Plant

Best Block Co., Milwaukee, Wis., increases capacity with new high-production block machine. Curing facilities designed for either one- or two-shift operation of the plant

By DAVID MOCINE



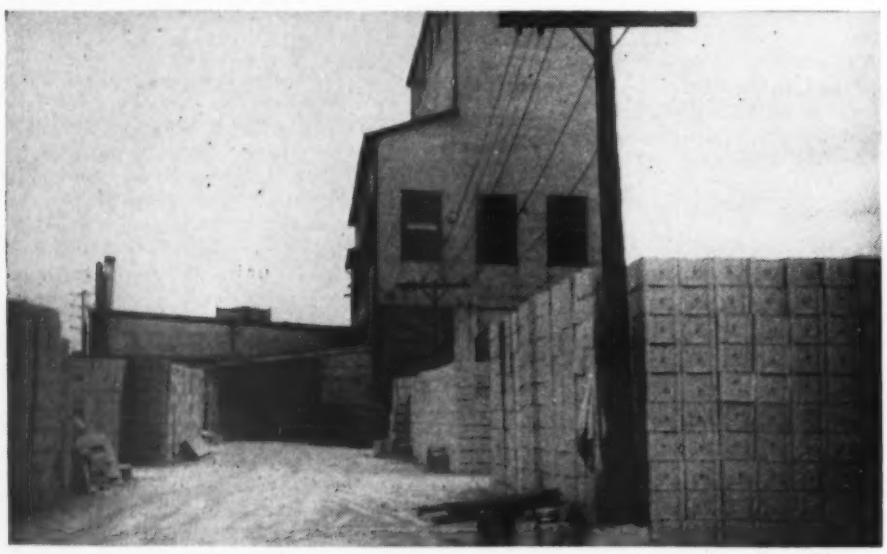
Block machine with a capacity of 900 block per hr.

FACED with the problem of increasing production and at the same time the economic inadvisability of plant expansion, W. J. Manhardt, president, Best Block Co., Milwaukee, Wis., visited plants in Pennsylvania and New York state to secure information on latest equipment and plant practices. One result of this trip was a decision to purchase a Model 15 Stearns vibrating type block machine with a rated capacity of 900 8- x 8- x 16-in. units per hour.

Another factor in the decision to purchase the new machine was the fact that the original block machines were wearing out and it was becoming necessary to make replacements.

The new vibrating type Stearns Model 15 differs from former models (Joltcrete 7 and 9) in that a plain pallet is used. After installation in the Best Block plant, a larger (3 hp.) motor was substituted, and it is now possible to make up to 1080 sand and gravel aggregate block per hr., or even a greater number of Haydite (light-weight) aggregate block.

The new machine replaced an Anchor, one of two in the plant, that had been used almost wholly for lintels and other odd lots and small runs (all of which work is now turned out by the one remaining Anchor). In addition to the Stearns and Anchor, two Besser "Super Tampers" of 420 block per hr. capacity each complete the company's machine capacity.



Main runway from curing rooms to storage yard. All runways are paved with concrete

Gravity Flow of Materials

Four mixers, one to each machine, are located on the second floor of the main building, where they can dump into the feed hopper located above each machine. The new machine requires a 50-cu. yd. mixer, the two Bessers each take a 42-cu. yd. mixer, and the Anchor takes a 21-cu. yd. mixer.

At the present time, both Haydite and sand and gravel aggregate are used, but the company expects to stress lightweight aggregate block when materials for its manufacture are once more available in quantity.

Aggregate is received in hopper-bottomed cars which discharge into a hopper below track level to an 18-in. belt conveyor, 250 ft. centers, inclining up to an elevation of 60 ft. at the plant where a short swing conveyor, also 18-in. wide, distributes the aggregate to the desired bin. Aggregate bins have a capacity of 9 carloads. The plant has its own railroad siding with trackage for eight cars. An electric winch is provided for spotting cars to be unloaded.

Cement is delivered in bulk by truck and elevated to overhead bins of 400-

bbl. capacity by a bucket elevator. Material for the mixes is gathered from the bins by an automatic traveling weigh lorry equipped with three Butler scales.

Air entraining portland cement was used for a short time, but was abandoned in favor of regular portland with limestone screenings added. The limestone, of a grade to pass ¼-in. screen, is added approximately in the ratio of 20 per cent of the aggregate in a 42 cu. ft. mix, and is used principally for greater plasticity.

Curing Facilities

Ten curing rooms, conveniently located in an "L" shape, with loading doors facing the machines, requires a minimum of travel from the Otto Ladwig off-bearers. Two rooms are of 7000-block capacity and eight rooms have a capacity of 6400 block. The rooms are of Haydite block construction with a 10-in. Haydite roof slab. The Haydite concrete used in this construction offers ample insulation for the temperatures encountered.

Best Block Co. has curing room schedules for either one- or two-shift operation of the plant. The curing cycle for one shift is seven hours (total steam time) at 160 deg. F., followed by two hours dry heat; and for two shifts the time is cut to five hours at 220 deg. F. followed by one and one half hours dry heat. The pressure at the boiler for the first temperature is 30 lb. and for the second is 50 lb.

Steam is generated by an 80-hp. Schwaube marine boiler, oil-fired by a Westinghouse controlled Ray oil burner. There were two major factors considered in the change-over from coal to oil firing for the boiler. The most important was the need for increased steam pressure, which was made available by an electrically controlled oil fire. The second factor was utility: the oil burner gives a constant temperature — controlled feed, and frees a man for other work in the plant who had previously been required almost constantly as a coal stoker. Also the presence of John L. Lewis in the coal picture was a factor in the decision to change to oil.

A 42-block lift truck rack has been found best adapted for transporting the block from the 420-block per hr. machines, and a 72-block rack for the new Stearns machine. Five lift trucks are provided for handling block racks: one gas (Clark) and four electric (one hand), Elwood-Parker and Barrett.

A total of 17 trucks is operated: 14 5-ton flat beds, two 5-cu. yd. dumps and one 18-ton, 22-ft. long semi-trailer unit. Deliveries are made over a radius of 100 miles from the plant, and occasionally the big semi-trailer makes hauls of several hundred miles.

Sales of the company are principally to contractors of large industrial buildings and schools, but in the early 1930's and during the height of the recent building ban, the expanded

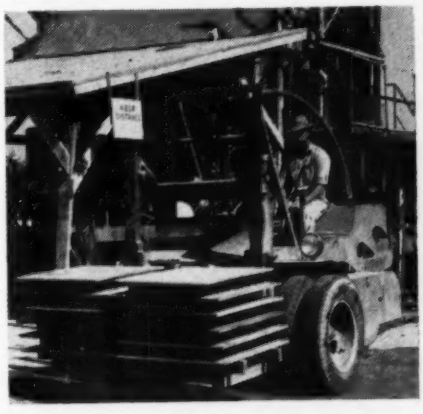
Rear view of plant, showing upper end of belt conveyor from aggregate hopper below track level. Bucket elevator for bulk cement has replaced bagged cement deliveries

farm market provided a large percentage of the firm's sales. Best Block Co. has no staff of salesmen at the present, though the need for such a staff in the immediate future is appreciated. At present all selling is done by the principals of the company, with perhaps the greatest share being sold by the consulting engineer the company provides to contractors in large installations not only of block buildings but also roof slabs and floor fillers.

Replace Old Machines

(Continued from page 121)

(2) this hopper (with sides about 8-in. high) moves over the mold and fills it; (3) vibration starts as the hopper moves back; (4) the mold moves forward and, simultaneously, the excess is struck off; (5) at the end of this horizontal travel, the mold is now under the press-out plate. The press-out plate compresses the blocks to proper height before pressing them through the mold onto wooden pallets that are hand-fed into the front of the machine. (6) The mold slides back to its original position, and the cycle repeats. The press-out plate is adjustable so that blocks of uniform height can be made. The degree of this adjustment will depend somewhat upon the mix used. The entire operation is automatic, with the cycles electrically controlled.



Loaded pallets of block from the machine are placed on lift truck platform and moved to stockpile area

Cement-Aggregate Reaction Test

AN ATTEMPT TO EVOLVE a qualitative test for cement-aggregate reaction that would give direct evidence of expansion and still be sufficiently simple for easy and quick application, led to development of the bi-aggregate slab used by the Council for Scientific and Industrial Research, Australia. The test is based on the distortion or torque produced in a body undergoing differential expansion.

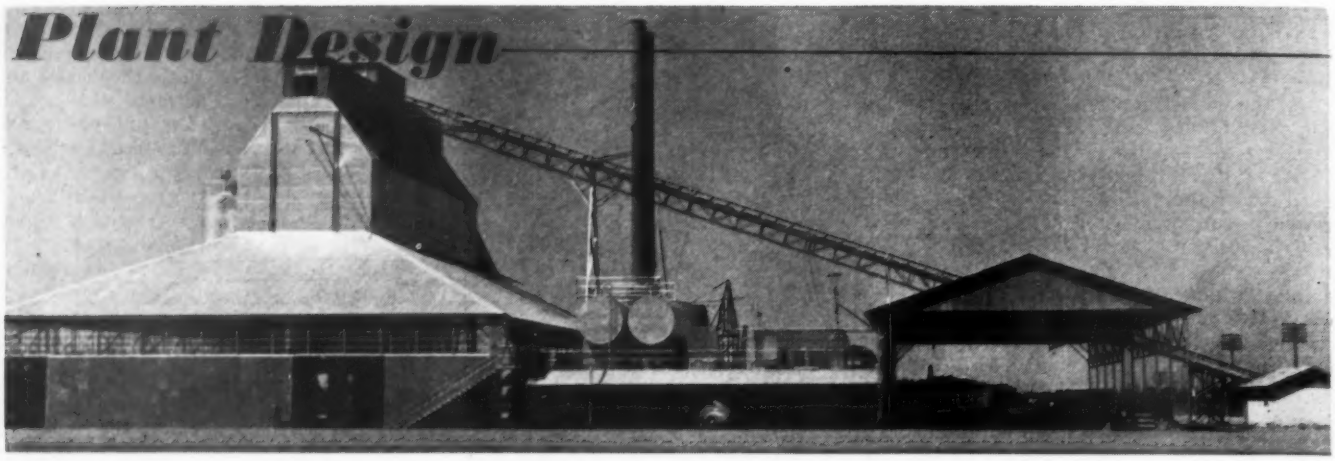
Concrete to be tested is formed into a slab 4- x 2- x ¼-in., with the thickness being made up of two layers of ⅛-in. each, composed of a known non-reactive aggregate concrete and the material being tested. After curing in a moist cabinet for 24-hr. at 70 deg. F., the mold is removed and the slab stored in moist air in a sealed container at room temperature (or 110 deg. F.) for various lengths of time. This method of storing was found to be most suitable for cement-aggregate reaction by T. E. Stanton, American Society of Civil Engineers, 1940. The control half of the slab is made with a clear rounded quartz sand from Leighton Buzzard, England, known to set up no reaction with cement.

First indication of reaction is given by development of damp-looking spots on the side of the slab bearing the reactive concrete (the non-reactive side shows no spots). These spots are believed to be due to the formation of silicate gel around grains of reactive aggregate, as suggested by H. S. Meissner, American Concrete Institute, 1941.

Number, size and development time of the spots gives a rough indication of the reactive or expansive quality of the aggregate under test. Period of spot development varies from six days for highly reactive material to as much as 80 days for aggregate showing only slight reaction. Slabs showing spots in six days can be expected to evidence distortion in as little as 28 days.

Ready-Mix Operation

READY-MIX CONCRETE CO., Yankton, S. D., has been actively developing local markets with the result it found it necessary to expand its original plant after only a year's operation. Present capacity is 200 cu. yd. per 20-hr. day. Maynard Larson is president and R. J. Blaszek plant manager.



Overall view of concrete products plant which will produce block, precast sections, and concrete pipe

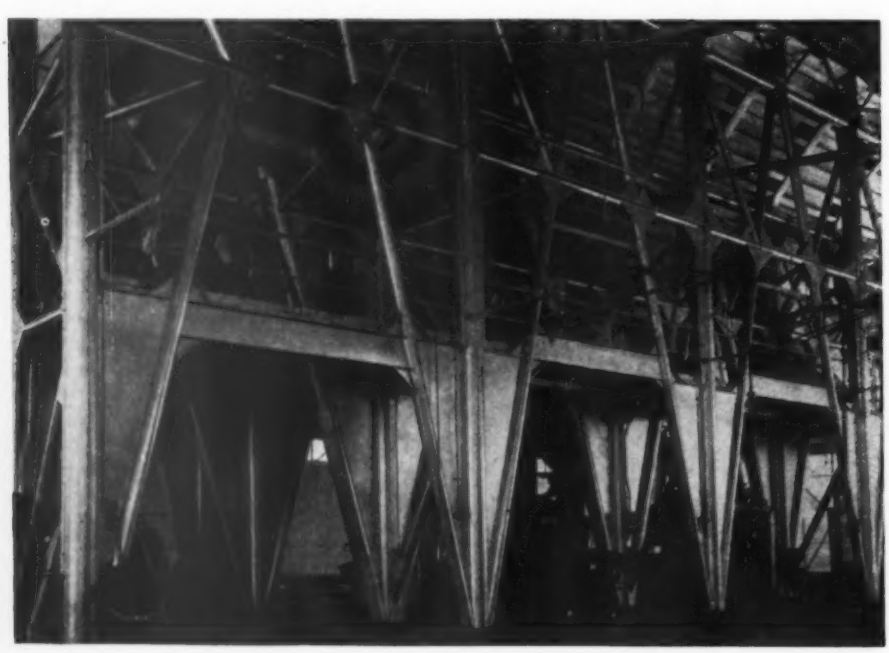
Manufacture Both Pipe and Block

New Stockton, Calif., plant of Basalite Division, Basalt Rock Co., is of unusual construction. Office and display room is modernistic

By W. B. LENHART

SOME OF THE ACTIVITIES of the Basalt Rock Co., Basalite Division, Napa, Calif., were described in ROCK PRODUCTS, April, 1947, in which it was mentioned that a new plant was being built at Stockton, Calif. An outline was given showing the determining factors in selecting location of a plant. The essence of these factors were: the plant must be located in a center of population; must be on a main highway; must have sufficient ground and terrain of such a nature that it could be attractively landscaped, etc. It was pointed out that the plant should be designed for the highest possible operating officiency, yet be designed so as to be attractive to passing motorists. The value of a neat appearing plant as a sales point cannot be overemphasized.

Having gone over these points with A. G. STREBLOW, president of Basalt Rock Co., some months before the article was published the writer should have been prepared for any surprises, but on inspecting the completed new plant found there still were unanticipated developments to be found in concrete masonry plant design. It carries out to a high degree the desires and intent of its owners to present a striking and pleasing appearance. One cannot help but get the impression, from this plant, that there is an industry that is sound and capable of meeting the highest demands of the builder and contractor. It is a striking contrast to the many so-called block plants that could be more aptly described as a "nigger's back yard."



Interior is of unusual construction. Structural members were made of surplus pipe from shipyard operations welded together to form an exceptionally strong framework

The plant dwarfs most of the block plants we have seen and is more imposing in appearance than any in the west. The large structure housing the equipment is located towards the back and center of a 12½-acre plot of ground that was first levelled, then rolled and packed and finally paved with 5 to 6 in. of Armorcoat asphaltic paving. The entire area has been fenced with a 72-in., steel link fence and in the front (center) of the lot is located a large, modernistic office and display room. A neat change room for the men also is provided. The plant is located about four miles south of Stockton on U. S. Highway No. 50 which is one of the arterial highways connecting the San Joaquin valley cities with the San Francisco Bay area.

Also Will Make Pipe

The Basalt Rock Co. has been in the concrete masonry business for many years but in this new plant the company will make its first venture into the concrete pipe manufacturing business. The new plant will have a McCracken pipe machine that manufactures pipe up to 36-in. diameter. Two Besser Super Vibrapacs have been installed for concrete block man-

ufacture with provision for possible addition of a third machine.

The main building housing these units is 100- x 162-ft. and is 85 ft. high. Near the top of this building is a line of four steel bins, each with four compartments, that have a total capacity of 2400 cu. yds. of aggregates. Below each bin section is the weigh batching equipment, with separate scales for cement and for the aggregates. There are four sets of Toledo scales; 5000 lb. capacity for the aggregates and 2000 lb. for the cement. Below the batching equipment are the 50-cu. ft. Besser mixers, and these mixers discharge to the hoppers over the block machines below. The mixers are driven by 30-hp. Allis-Chalmers motors. A separate 400-bbl. steel silo for cement is provided for each batcher. The cement silos are behind the aggregates bins, and cement is delivered to each cement weighing hopper by an inclined screw conveyor, flow of cement to the screw being controlled through a Caldwell rotary cement gate that is driven from the tail assembly of the conveyor. Cement screws are driven by General Electric motors through Pacific motorized speed reducers.

The concrete pipe machine is fed mixed concrete over an inclined belt conveyor. This method of installation was provided to give more head room. The batching equipment could be used for ready-mixed concrete if desired since there is enough head room provided for trucks to get under the batcher.

Unusual Structural Design

The entire structure is of steel and reinforced concrete of heavy design. Supporting the steel bins are 20 massive steel legs made up of heavy welded 12-in. diameter steel pipe. The knee braces that are a part of each of the pillar members are also of 12-in. diameter pipe with the triangular openings between the post and knee braces

Two of the high production concrete block machines

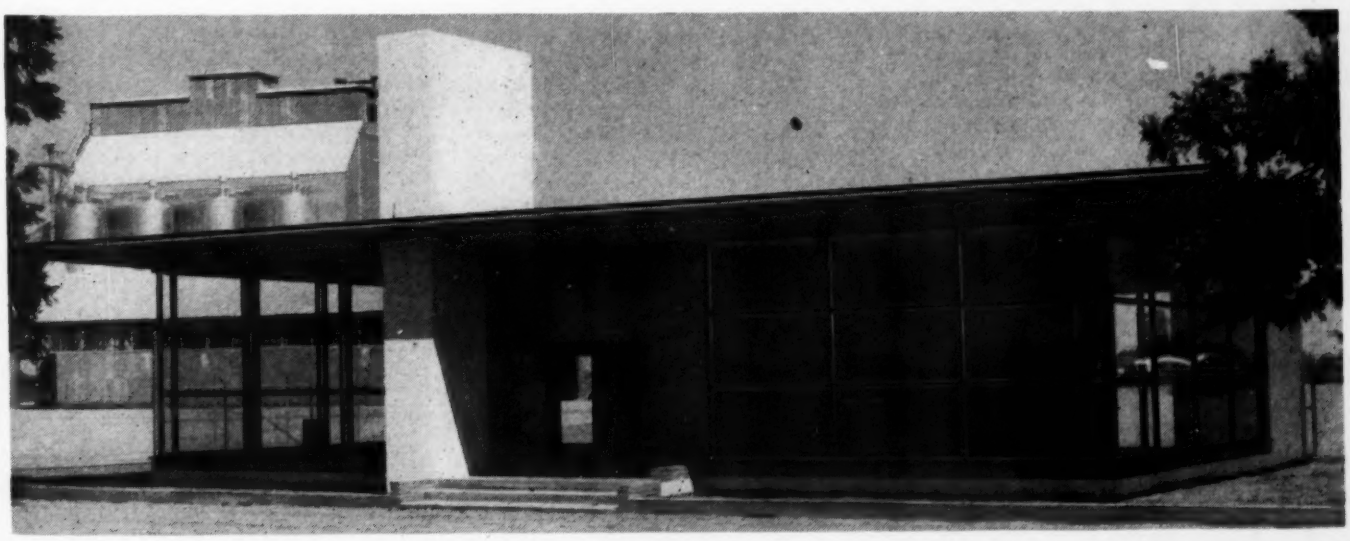
filled with welded steel plate. They give one the impression of extreme strength and rigidity, but actually they were designed to carry the loads intended. The "I" beams supporting the mixer and batcher floor are 4- x 14-in. with wood floors on the superstructure to prevent foot slippage. The main floor is of concrete. The inside and outside of the building have been painted with aluminum paint.

Curing Facilities

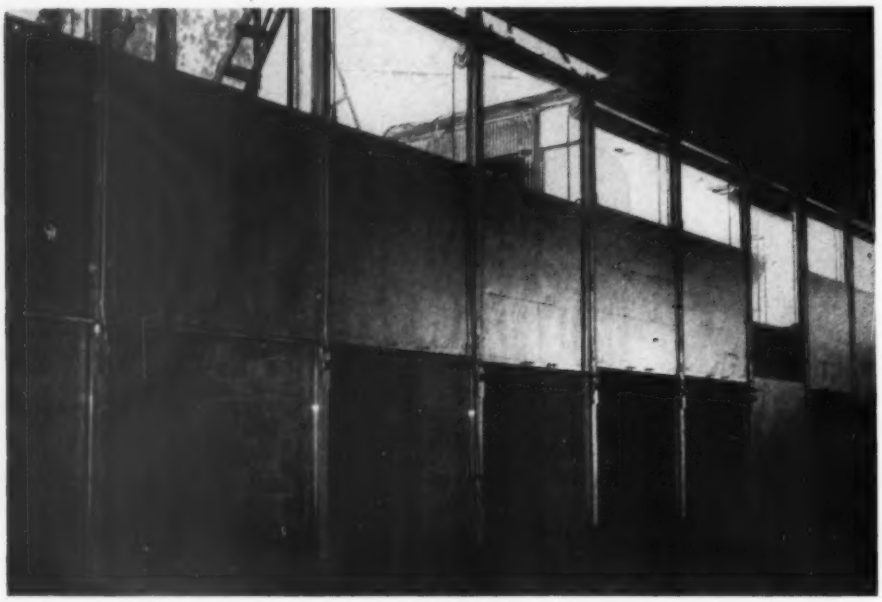
In front of the block machines, but with ample room between, are 11 steam-curing kilns measuring 7 ft., 6-in. by 68 ft., 8-in. These kilns were designed to correspond with the widths and sizes of the racks used so as to fully utilize the kiln space. The kilns are open at both ends to facilitate loading and unloading. They were kept narrow so that the doors could be easily shut quickly. The kilns are of concrete masonry construction with reinforced slab concrete roof. Steam for curing is supplied by an oil-fired 250-hp. marine boiler removed from one of the ships salvaged in the shipyards of the company. The oil storage tanks for the steam plant are mounted horizontally on top of the kilns, with a 48-in. diameter American Blower fan, also located on top of the kilns, for circulation of steam through the kilns. The electrical transformers also are mounted on top of the kilns.

Immediately behind the kilns is a 53- x 162-ft. covered storage area with two electric overhead cranes spanning the area. This area may later be used to fabricate structural concrete roofing slabs and similar items.

Aggregates are delivered to the plant over Southern Pacific rails where a 16-car switch has been provided. A Caterpillar tractor is used for spotting cars at the hopper. The cars dump to a track hopper serving a 24-in. inclined conveyor belt on 286 ft. centers. The belt is B. F. Goodrich and rides on Jeffrey carrier rolls. This belt discharges to a Link-Belt shuttle conveyor over the aggregate



Modernistic office built of Basalite construction, including a new veneer slab, 2¼- x 24-in., at the front entrance. The pylon, above the concrete slab roof, is stuccoed, and will have in large block letters the word, BASALITE



Curing facilities, sliding door construction

bins. The equipment will handle a 60-ton car in about 16 minutes. Most of the aggregate used is pumice secured from company-owned deposits near Napa, Calif.

Portland cement is delivered to the plant via trucks and is elevated to the top of the plant by a conventional screw conveyor and bucket elevator system and delivered to the four storage silos by screw conveyor.

The plant was designed under the direction of Don McCall, chief engineer for the Basalt Rock Co., with A. F. Liebscher attending to the structural design. Ernest Illsley was the construction superintendent for the company. Alex Lommel is district manager at Stockton.

Concrete Products News

ENTERPRISE ACADEMY, Enterprise, Kan., has announced the opening of the Enterprise Concrete Block Manufacturing Co., under the direction of E. P. Heinrich.

JONES CONSTRUCTION Co., Pleasanton, Kan. has started the production of concrete block at the rate of one every three minutes. J. T. Jones is manager.

CLEMENS ARENZ AND JOSEPH BOLZ have announced plans to build a concrete block plant at Kiel Wis.

BELVIEW CEMENT PRODUCT Co., Belview, Minn., now is producing concrete drain tile at the rate of 3,000 tile per day, under the management of Mr. Omtvedt.

BARNUM BLOCK AND BRICK Co., Barnum, Minn., has started the manufacture of concrete block. Vern Thompson, George Hansen, and Joseph H. Johnson are plant managers.

JAMES BUCHANAN AND MARTIN REESE have announced the opening of the B. and R. Block Co. at Franklin, Ohio, for the production of cinder and concrete block.

E. A. ROGGE, owner and operator of the Cast Stone Block Co., Marinette, Wis., has begun the manufacture of cast concrete steps and concrete joists under a patent obtained in 1943. The steps feature an interlocking lug that will insure their remaining in place.

KOLINSKI CONCRETE Co., West Allis., Wis., has increased its stock from 2000 shares no par value to 3000 shares no par value.

MALCO CONCRETE BLOCK Co., Humboldt, Tenn., consisting of a partnership between Frank Morris and Bruce Alexander, has been dissolved.

A. E. MORRIS has been named new superintendent at the Decatur, Ala., plant of the Universal Concrete Pipe Co, of Columbus, Ohio.

CEMENT PRODUCTS Co., Missouri Valley, Iowa, has been purchased by Charles P. Gilmore and will now be known as the Gilmore Cement Block Plant.

WART COOPER, Clarksdale, Miss., in partnership with F. J. Jacks of Tunica, Miss., has started a ready mixed concrete plant in Clarksdale.

HESLER & LA RUE, INC., Evans Mills, N. Y., has begun production of cinder and concrete block at a capacity of 2,000 per day. The new firm, which has been capitalized at $50,000, has the following officers: William H. Hesler, president; Benjamin H. Hesler, Jr., vice-president; and Edward J. La Rue, secretary-treasurer.

SYLVESTER J. LINTON, Tonawanda, N. Y., had his concrete products plant damaged to the extent of $2,000 by a fire caused by an overheated motor.

COUGHLIN CONCRETE BLOCK Co., Ellenville, N. Y., engaged in the manufacture of concrete and cinder block, lost a hydraulic lift and had other machinery damaged in a fire caused by a spark from a gasoline engine.

H. A. KRUM, owner and operator of the Red River Cement Products Co., East Grand Forks, Minn., has announced the installation of a new Besser Super-Vibra Pac concrete block machine at his plant. The new equipment has a capacity of 600 blocks per hour.

DODGE CITY CEMENT PRODUCTS Co., Dodge City, Kan., has been purchased by Jack Kinzy from L. C. Kinzey and Grant Stannard. The company specializes in concrete block for foundations, stepping stones, concrete drainage tile, concrete brick for walls, silo blocks, and also supplies ready-mix concrete.

CONCRETE BLOCK & CEMENT BRICK Co., has started a concrete block and brick plant in Amherst, Wis., with a capacity of 1000 block per day. Kelley Nash and Nels Westenberger are the owners.

LLOYD K. COON has opened a concrete block plant in Sigourney, Iowa, with a capacity of 1000 block per day.

C. B. CAVANAH, JAMES CAVANAH AND B. F. MCNEELEY, all of Madisonville, Ky., have purchased a concrete block plant at Dresden, Tenn., from Chester Carlisle, who started the business several months ago.

WESTERN READY MIX Co., Quincy, Ill., has started the production of mixed concrete at the rate of 200 yd. per day. John Fierke, who also is connected with the Missouri Gravel Co., is president of the concern, and Orville Flaiz is secretary and plant manager.

U. S. ENGINEER WATERWAY EXPERIMENT STATION, Clinton, Miss., has established a $500,000 concrete research laboratory at its sub-station. This is the first laboratory of its kind to be opened in the United States.

HEMINGFORD HOLLOSTONE Co., Alliance, Neb., has started the production of cement block at the rate of 3000 per day. Bruce Hagemeister and Ben Hyland own and operate the plant.

READY-MIX CONCRETE Co., Yankton, S. D., is now producing 200 tons of ready-mixed concrete per day. Maynard Larson is president of the concern and R. J. Blazek is plant manager.

LAWRENCE WALTON of Sabetha, Kans., has been experimenting with a new type of poured concrete housing construction which he has found very successful. It consists of pouring the walls of the building into forms laid flat on the ground and then raising the walls into position with a derrick. The walls are joined together by welding the steel reinforcing rods at the corners.

READY-MIX CONCRETE Co., Plainview, Texas, under construction by the Amarillo Cement and Builders Co., Amarillo, Texas, has started the production of cinder concrete block under the management of Harry Garmand.

JARVIS & STRANGE CONCRETE PRODUCTS Co. has been established at Upton, Ky., to manufacture and sell concrete block. J. A. Strange and Clem Jarvis are the owners.

NEW MACHINERY

Concrete Block Fork

SCHMIDGALL MFG. CO., Peoria, Ill., has developed a completely automatic fork of unique design for attachment to any lift truck, eliminating the need

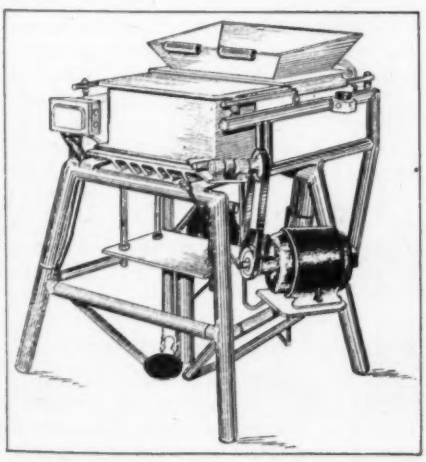
Concrete block fork for lift truck has rubber gripping mechanism

for pallets in handling concrete block. The prongs are steel plate individually bolted to the lower part of the protecting structure and easily removed. When the load is prong-lifted and comes in contact with the prong, a rubber gripping mechanism is actuated. The rubber grippers can be replaced at low cost.

Block made with any aggregate in 4-, 6-, 8-, and 12-in. sizes can be handled by the Schmidgall concrete block fork model 33. The capacity of the fork is limited only by the capacity of the lift truck on which it is used. It can be mounted or detached in less than two minutes as there is no controlling mechanism involved between the lift truck and the fork. The prongs are self-cleaning and will not become clogged with dust or particles.

Block Machine With Hydraulic Ejector

LESLIE C. MILLER SUPPLY, INC., Bedford, Ohio, is manufacturing the Agitamper block machine which features hydraulic operation of the block ejector. The ejector comprises an hydraulic oil pump actuating a cylinder which is powered with a ½-hp. motor



Block machine with hydraulic block ejector

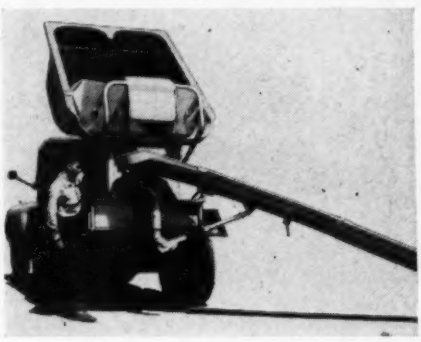
operating through a clutch. A simple movement of the valve causes the block to be hydraulically ejected.

This machine is so constructed that the mold box and the cores are moved positively in a synchronous action, agitating the concrete, causing it to settle rapidly with each movement of the core and box, exerting a positive squeezing effect at the rate of 2600 actual tamps per minute. The core and mold box movement is powered by ½-hp. electric motor. It is said that very little noise and vibration is noticeable with this machine. Weight of the machine is only 430 lb.

This company also announces that it is the authorized agent of the Old English drop siding block giving the effect of a wooden drop siding to houses built with this block. Royalties for the manufacture of this block are relatively low.

Improved Haulage Unit For Concrete

MAXON CONSTRUCTION CO., INC., Dumpcrete Division, Dayton, Ohio, has improved its 2-cu. yd. Dumpcrete for hauling air-entrained concrete and other materials. Discharge height was



High discharge concrete haulage unit

increased to a point of over 5 ft. off the ground; the chute assembly can now be quickly and easily swung away to either side when dumping sand and gravel or concrete without using the chute. Steel plate running boards have been added to provide protection from road dirt and may be used as a platform for operating discharge controls.

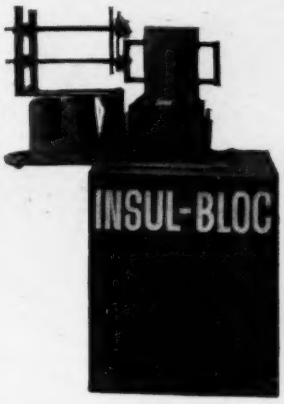
A larger Dumpcrete has been announced which will have a 3-cu. yd. rated concrete capacity and a water level capacity of 5 cu. yd. A 4-cu. yd. body also is being produced.

Tongue-and-Groove Concrete Block

DINABURG EQUIPMENT CO., Binghampton, N. Y., a division of Dinaburg Block Co., has brought out its Insul-Block machine to make a special type tongue-and-groove block with which a cavity wall construction is laid up.

The machine, employing high rate of vibration, uses a wood pallet. The off-bearer and pallet feeder is completed as one operation, and the stripper is controlled by foot button. It is a two-man operation with a production of about 900 block per 8-hr. day.

It is said that the inside walls of block, due to their insulation qualities, can be painted or papered direct-

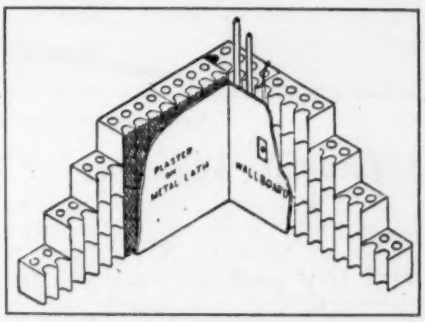


Block machine which makes a tongue-and-grooved block

ly. No furring is necessary on inside walls. The block is tongue-and-grooved on four ends, and can be arranged for a clapboard effect. It is in two sections joined by reinforcing rods.

Self-Furring Block

SIMON BRENNER, merchant of Wooster, Ohio, and JAMES MCCOMAS, designer and builder of the same city, have collaborated in the design of what has been termed a "self-furring" concrete block. Details of the design



Showing wall construction with "self-furring" concrete block

and the method of laying up in a wall are shown in the illustration. The grooves permit the steel lath to be stretched across the corrugated surface of the units for plastering. They also form channels for cold air returns and the installation of utility pipes and conduit.

Trencher for Pipe

PARSONS CO., Newton, Iowa, subsidiary of the Koehring Co., has announced the 200 Wheel Trenchliner which should prove to be a useful tool for concrete pipe manufacturers who also contract for the laying and installation of pipe. This machine digs up to 5 ft. 6 in. deep, with a maximum digging width of 24 in. Digging speeds range from 2.5 in. to 20 ft. per minute. Gas or Diesel power is available. Koehring shovel type crawler shoes, 18 in. or 24 in., as well as tractor type shoes can be furnished.

PLAY SAFE!
BUILD A FIREPROOF MOUNTAIN HOME
CEMENT LOG BLOCKS
$179.00 Per Thousand
MITERED CORNER LOG BLKS.
$18.40 Per 100 Blocks
LOG END BLOCKS
$19.80 Per 100 Blocks
Cement Log Blocks
A NEW and DISTINCTIVE design in CEMENT BLOCKS
especially created to simulate rustic log cabin architecture
The partially completed cabin pictured above, is built of CEMENT LOG BLOCKS, which, when assembled and painted, produce the appearance of natural timber. Completed 8-foot walls in this 14x28-foot cabin contain One thousand two hundred and four 4x8x12-inch center Cement Log Blocks, plus 96 Log End, Cement Blocks, total cost of which is $234.52.
LESS THAN 57c per square ft!
Beautiful -- Class "A" -- Life-time Construction
Yarter Cement Log Block Co.
PLANT LOCATED AT BIG BEAR LAKE, 2 MILES EAST OF BIG BEAR LAKE POST OFFICE ON MAIN HIGHWAY
Mailing Address - Box 356
Big Bear City, California
CONTRACTORS! . . . .
Our Cement Log Blocks, Standard Blocks & Cement Products are manufactured of HIGH GRADE IMPORTED AGGREGATE. We invite your inspection and approval.

Advertising literature illustrates concrete log block

Lightweight Aggregate

DANT & RUSSELL, St. Helens, Ore., has developed a new building material known as Dantore. This product is made from perlite by expanding the crushed product in a furnace at 2500 deg. Three products, using Dantore, are now being marketed: lightweight plaster aggregate, acoustical plaster, and ready-to-use hardwall plaster. Other products also are being developed. Dantore weighs only 12 lb. per cu. ft. as compared with 85 lb. per cu. ft. for sand. It is claimed that the little glass globules of Dantore and the gypsum are more flexible in adjustment to the stresses of settling, and it also offers a considerable degree of insulation.

Concrete Log Cabins

YARTER CEMENT LOG BLOCK CO., Big Bear City, Calif., is manufacturing block that simulates logs for a log cabin effect when laid up in a wall, with either peeled log or bark effect dependent on the type of paint applied. N. H. Yarter has a franchise from John Newport, inventor of the process, who states that the special log block forms can be made to fit any block machine.

The company is particularly well situated for manufacture of this type of block, being located in the Big Bear valley of the Sierra Madre mountains, a favorite summer and winter resort spot for residents of Los Angeles. Company advertising emphasizes the fire resistant qualities of concrete block construction, which is a potent selling point in this area of frequent forest fires.

Two Flam machines enable the company to produce 6000 block per day, plus other concrete specialties. Because the valley does not supply a good grade of stone, aggregate must be brought up from San Bernardino. The block measure 4- x 8- x 12-in. and sell for 17.9¢; two types of corner for either mitered corner or log end cost 18.4¢ and 19.8¢, respectively.

Association President

JAMES O. HALL, who is associated with Tison and Hall Concrete Products Co., Harrisburg, Ill., has been elected president of the Southern Illinois Concrete Manufacturers Association. Other officers elected include: F. E. Holmes, Marion Block Co., Marion, Ill., vice-president; Robert E. Eadie, Carmi Concrete Products Co., Carmi, Ill., secretary; and R. E. Gordon, Sesser Concrete Products Co., Sesser, Ill., treasurer. Lewis Phillips of the Phillips Concrete Works, Benton, Ill., and John Stankavich of Mount Vernon, Ill., were elected directors to fill vacancies that had expired.

Portable Air Compressor Lubrication Manual

LUBRICATION of portable air compressors is the subject of Texas Company's publication "Lubrication" for May. This issue is chiefly concerned with the proper lubrication of equipment, and is complete with graphs, charts, line drawings and photographs of all principal makes of air compressors. This booklet might be called a basic text on the lubrication and maintenance of gas, oil and Diesel driven portable compressors.

The first few pages discuss general lubricating technique, coupled with the proper type of oil to withstand presures and discharge temperatures of single- and two-stage air compressors. Next are taken up advantages inherent in the use of naphthenic versus paraffine base oils.

The conclusion is drawn that for most compressors and most operations, naphthenic base oils are desirable. Points covered in support of this view are bearing lubrication (force feed or splash system), cylinder lubrication, pressure, condensation and non carbon-forming tendencies of this oil. The publication closes with an admonition to operators to avail themselves of benefits which result from the use of suitable additives in lubricants for both compressors and engines of such portable equipment.

Elected M.W. Grand Master

ALTON J. BLANK, general manager of Cementos Atoyac, S. A., Puebla, Mexico, has been elected Grand Master of M.W. York Grand Lodge of Mexico, F. & A.M., for the year 1947-1948. Mr. Blank became associated with the cement industry under the guidance of his father, the late John A. Blank. He was chief chemist, first for the Georgia Cement and Stone Co. and later for the Phoenix Portland Cement Co. In January, 1926, he went to Mexico as chief chemist for the Tolteca Cement Co. in Tolteca, Hidalgo. Two years later he joined Cementos Atoyac, S. A., as general superintendent and supervising chemist, and subsequently became general manager of this company and five of its subsidiaries. Mr. Blank has written some 60 articles on cement chemistry and problems of the industry, many of which have appeared in ROCK PRODUCTS. He lost both of his parents in an automobile accident in Virginia in March, 1946.

Named Superintendent

A. E. MORRIS, who has been associated with the Universal Concrete Pipe Co., Columbus, Ohio, for several years, has been appointed superintendent of the Decatur, Ala., plant.

Lift Truck Attachment

HANDLING CONCRETE PIPE has been made simpler and has been speeded up by the adoption of a special attachment for lift trucks designed by H. M. Shaw, president of the N. C. Products Co., Raleigh, N. C. Pipe can be yard-stored in neat rows or can be loaded to trucks easily and quickly with the aid of this attachment. The accompanying illustrations show the manner in which the pipe is handled.

The attachment is a frame of welded construction consisting of ½-in. steel plates. It is 9-in. thick, 2-ft. 3¾-in. high, and 15-ft. 4-in. in overall length. It has three sections, the center one 8-ft. 4-in. long and the two end sections each 42-in. long. These end sections can be removed, if desired, in a matter of a few minutes. Cold-rolled shafts, or arms, 2½-in. in diameter and 3-ft. 8⅝-in. long, with a collar 8⅝-in. from the end, are inserted into keyed holes in the face of the frame. A projection on the arm corresponding to the shape of the keyed hole secures the arm to the plate when the arm is turned a quarter turn.

Holes in the frame are placed at proper intervals to accommodate different sizes of pipe. There are five rows, each with different spacing. Eight 15-in. pipe can be handled on the eight arms in the one row, with seven more units supported above the row of eight pipe. Spacing of the arms permits the handling of seven 18-in. pipe, with six more supported above; five 24-in. or three 42-in. units. For the larger sizes, each unit is supported by two of the arms, while for the smaller sizes, each arm handles one pipe.

The lift truck in service at this plant is a 7-ton Ross, although the frame attachment can be adapted to any type of lift truck with sufficient capacity.

Mr. Shaw, originator of this improved method of conveyance, invites inquiries should other pipe manufacturers be interested.

Above: Large number of concrete pipes can be handled with special attachment on lift truck. Below: Showing how "arms" are inserted in steel frame

Lightweight Roof Slabs

DUFFCON CONCRETE PRODUCTS, INC., Cresskill, N. J., is manufacturing a lightweight reinforced concrete channel roof slab in standard sections, 24-in. wide, 2¾-in. leg and 1-in. web with dapped edge. Capacity of the plant is approximately 3000-ft. of units per day, using high early strength portland cement, Waylite aggregate and plain sand, with forms being filled on a vibrating table. Compressive strength of these units is 3360 p.s.i. at 28 days.

Board of Standards and Appeals, New York City, conducted load bearing tests by supporting typical units at each end with a 7-ft. clear span, using 94-lb. bags of cement for load. Average of three tests was 3446 lb. load before breaking.

Curing Cycle Test Report

NATIONAL CONCRETE MASONRY ASSOCIATION has just issued an interim report on findings during the first phase of extensive tests to determine the best optimum methods for steam curing various types of block. Tests are being carried out at three different plants producing three types of block: sand and gravel aggregate, Celocrete and cinder aggregate.

Variations are greatest in the amount of live steam time in the kiln and temperature range; with lesser differences in soaking period and hot air drying time also being noted. Results are expressed in percentages of the strength ratio between the steam cured block and the control block (taken from the same batch and moist cured). Paul M. Woodworth, Chairman, Technical Problems Committee, Subcommittee I on Curing Methods, is supervising the test program. A more complete and detailed report on these tests will be released later this year, when it will be possible to include results of other curing studies not yet completed, together with auxiliary data pertinent to curing methods.

Packaged Stone Entrance

CONCO BUILDING PRODUCTS, INC., Mendota, Ill., is now placing on the market through national distributors 12 patterns of stone entrance, each piece cut and numbered at the quarry. A typical stone entrance consists of 35 units, and can be laid up by a brick layer merely by following the numbered chart shipped with each package. The economies of standardization and mass production make these entrances available for as little as $50.

Ready-Mix Plant to Open

A. P. CAUSBY AND CO., Lenoir, N. C., will soon open a ready-mix concrete plant adjoining the Lenoir Mills. A. P. Causby and Guy Connelly are co-owners of the new enterprise. The concern will operate a fleet of trucks to furnish ready-mix concrete for all types of construction in the area.

Two-Level Plant

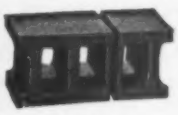
ALLISON CONCRETE PRODUCTS CO., Stanberry, Mo., has placed a new plant in operation with a capacity of 1000 units per day. Earth reclaimed from the plant excavation was utilized to build ramps, allowing trucks delivered aggregate to be dumped directly to overhead bins.

FASTER CUTTING ...with Clipper Masonry Saws

Your Special Size and Shape Brick or Concrete Block can now be "Tailor-Made" at a moment's notice!

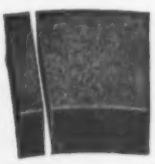
The new Clipper Multiple Cutting Principle makes possible faster cutting of every masonry material regardless of hardness.

Here are a few typical examples of the speed and accuracy with which concrete products and fire brick can be cut.



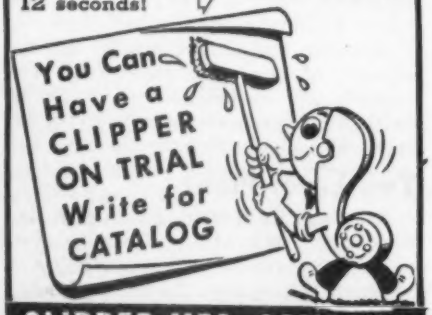
This concrete block, converted into a special size, was cut completely in two in 19 seconds.

One of the many intricate cuts performed on first quality clay brick for heat treating furnaces—made in 8 sec.



Rotary Kiln Blocks, cut to size for "key" bricks in rotary kilns, require only 10 sec. for completion of cut.

Basic refractories for steel furnaces or cement kilns must be accurately installed. This magnesite brick was cut in 12 seconds!



CLIPPER MFG. COMPANY
Warwick at 28th, Kansas City 8, Mo.

Thomas W. Noble Award

THE NATIONAL CONCRETE MASONRY ASSOCIATION, Chicago, Ill., has agreed to sponsor the Thomas W. Noble Award for the achievement, idea or suggestion which offers the most valuable contribution to the industry. A cash award of $500 will be made annually for the best contribution. All rules, procedure and judging are solely in the hands of the past presidents of the Association. Mr. Noble, who has for many years been engaged as a distributor for concrete products machinery, made the offer of the Award in a desire to stimulate thought and initiative on the part of producers and their employes for the continued prosperity of individual plants and the industry as a whole.

T. W. Noble

Awarded Huge Concrete Cribbing Slab Contract

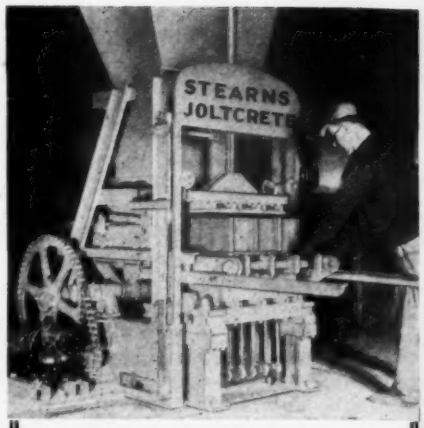
PORT ANGELES CONCRETE PRODUCTS Co., Port Angeles, Wash., has received a contract for casting 9000 concrete slabs for cribbing as a part of the Hugh Govan project for Olympia highway widening along Lake Crescent. Fred Strange, plant manager, said that this was the largest order of its kind ever placed on the Olympic peninsula.

Start Ready-Mix Plant

LUEBKE CONCRETE Co., Fort Atkinson, Wis., recently started production of ready-mixed concrete. George Luebke is president of the new company and Mrs. Luebke is office manager.

Farm Trade Developed

GEORGE KAUTZMAN, Beach, N. D., recently began operation of a block plant. The plant has a capacity of 800 block per day with a Concrete Block Equipment machine.



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